

2005 Regional Urban Water Management Plan

Inland Empire Utilities Agency



November 2005
Volume II

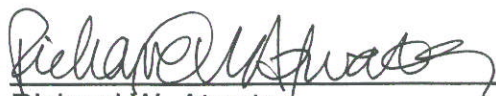
PREFACE

The Inland Empire Utilities Agency (IEUA) is pleased to present this 2005 update of the Regional Urban Water Management Plan (UWMP). IEUA is responsible for regional urban water supply planning for the western portion of San Bernardino County.

The UWMP 2005 is a public statement of the goals, objectives and strategies needed to maintain a reliable water supply for the IEUA service area. It is intended to be consistent with and to support the implementation of the Chino Basin Watermaster's Optimum Management Program, commonly called the "OBMP Peace Agreement".

The UWMP 2005 lays out a vision for water management over the next twenty years. For the short term, defined as the next five years (2005 – 2010), the UWMP 2005 provides a specific implementation program. But as the horizon broadens further into the future, a greater range of options and opportunities become possible. Therefore the plan is less specific for the year 2025.

The preparation of this UWMP was primarily done by IEUA staff. However, the Metropolitan Water District of Southern California, Chino Basin Watermaster and all of the retail water agencies within the IEUA service area contributed to the technical documentation. This was a "team effort" and we thank all who helped to prepare this 2005 Regional Urban Water Management Plan.



Richard W. Atwater
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DECEMBER 22, 2005
Date

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Executive Summary

2005 Urban Water Management Plan

Inland Empire Utilities Agency

The Inland Empire Utilities Agency (IEUA) prepared the 2005 Urban Water Management Plan to comply with Urban Water Management Planning Act. This Plan updates the last Urban Water Management Plan submitted in 2000. It provides an overview of current and projected water supplies and demands over the next twenty years, a description of the water conservation and water management activities that are planned and addresses the topics of reliability, water quality and opportunities to maximize local water sources, including conservation, groundwater and recycled water, and to minimize the need for additional imported water supplies within IEUA's service area.

The 2005 Urban Water Management Plan was prepared in close coordination with the retail agencies within IEUA's service area as well as with the Metropolitan Water District of Southern California (MWD), Santa Ana Watershed Project Authority, Chino Basin Watermaster, Water Facilities Authority, the Chino Basin Desalter Authority and other cities and agencies within the watershed. The water demand and supply information was based upon projections provided by the area's retail agencies, Chino Basin Watermaster and MWD. Companion 2005 Urban Water Management Plans were also prepared for the Water Facilities Authority and the Chino Basin Desalter Authority and are included in the appendix to this Plan.

IEUA is a municipal water agency that delivers supplementary imported and recycled water within its service area as well as provides regional wastewater treatment services with domestic and industrial disposal systems and energy/production and composting facilities. IEUA's service area covers 242 square miles in the southwestern corner of San Bernardino County and currently serves a population of about 800,000. IEUA provides services to the cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Rancho Cucamonga, and Upland as well as the Monte Vista and Cucamonga Valley Water Districts, the Fontana Water Company and the San Antonio Water Company.

Implementation of the 2000 Urban Water Management Plan

As predicted in the 2000 UWMP, significant population growth and new development has occurred within IEUA's service area over the past five years. Population in the service area was about 700,000 in 2000 and has grown to approximately 800,000 in 2005.

During this time IEUA, in partnership with the communities it serves, developed an integrated regional strategy for diversifying local water supplies. As a result,

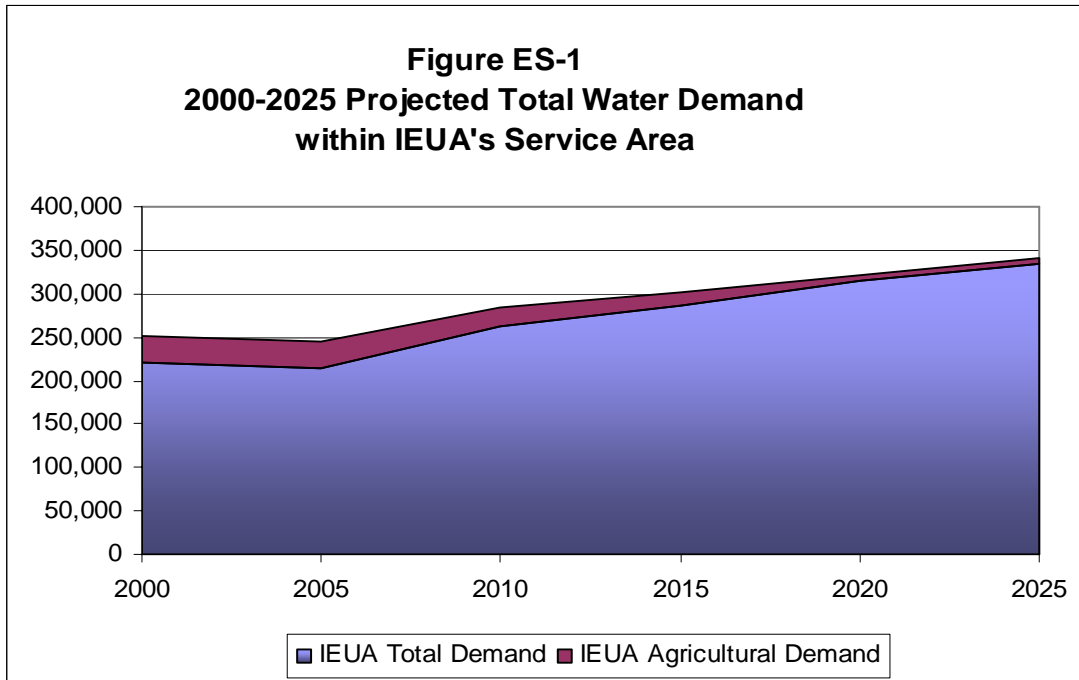
local water supplies have been greatly expanded. By 2005, the regional strategy had resulted in:

- Increased conservation
- Doubled use of recycled water
- Increased groundwater production through desalting facilities
- Development of an award winning Groundwater Recharge/Recovery Program using local storm water and recycled water to supplement the use of imported water for replenishment
- Establishment of a “Dry Year Yield” Program (33,000 AF of new supply)
- Development of a \$350 million capital improvement program that will produce over 160,000 acre-feet of new local water supplies in the next 20 years;
- No increase in the amount of full service imported water used within the service area despite significant population growth.

Water Demand

Total water demand in the IEUA service area in 2005 was about 244,000 acre-feet. Despite the increase in population, the level of demand is virtually the same over the five year period. Regional conservation programs were significantly expanded during this time and contributed to the area’s improved water use efficiency.

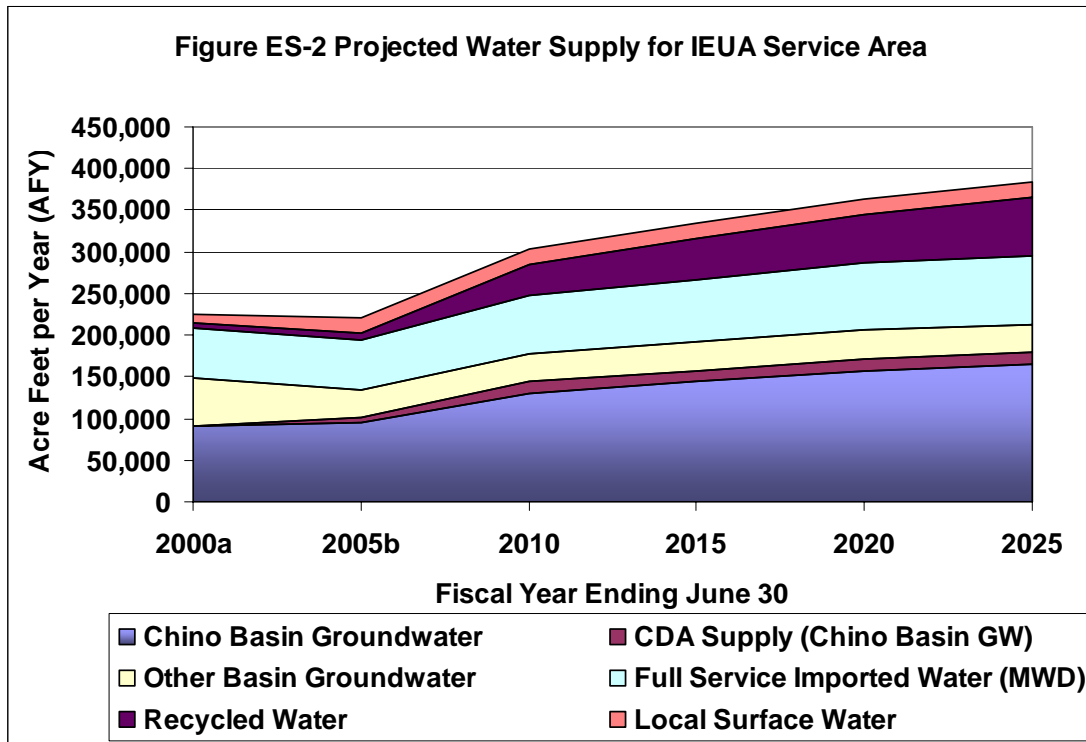
Looking ahead, population within IEUA service area is expected to reach over 1 million people by 2025. Projected water needs are expected to increase by approximately 100,000 acre-feet per year (from 244,000 acre-feet per year to about 340,000 acre feet per year). This represents a potential 40% increase in the areas water need if no additional improvements in local water use efficiency occur during the next twenty years. The future water demand forecasts are conservative. With conservation, water demands are expected to increase to about 300,000 acre-feet per year. Figure ES-1 presents projected total water demands.



Water Supplies

The regional water management strategy within IEUA's service area is to maximize the use of local water supplies and minimize the need for additional imported water, especially during dry years and other emergencies when imported water is less reliable. In 2005, local water supplies, including groundwater, recycled water, surface supplies and conservation, meet 80% of the water needs within the service area, while imported water from the Metropolitan Water District of Southern California meets the remaining 20% of demand.

Over the next twenty years, local water supplies are expected to increase by more than 130,000 acre-feet while projected full service imported water needs are expected to increase only slightly over the same period. By 2025, the planned development of local water supplies and implementation of water conservation programs will enable the area to continue to meet about 80% of the water needs of the service area from local sources. Figure ES-2 presents projected water supplies.



Significant investment in local facilities will be required in order to achieve the goal of reducing the need for additional imported water. Over the next fifteen years, over \$350 million is being spent to enhance local water supplies. These expenditures include \$110 million for recycled water projects, \$50 million for refurbishment of groundwater recharge basins, \$150 million for the construction of desalting facilities, \$27 million for the Dry Year Yield program and over \$20 million in conservation programs.

Water Reliability

The available water supplies and water needs for IEUA's service area were analyzed to assess the region's ability to meet demands for three scenarios: a normal water year, single dry year and multiple dry years. Key assumptions included:

- Reliance on assurances provided by the Metropolitan Water District of Southern California in its 2005 Regional Urban Water Management Plan that it could meet 100% of projected supplemental full service water supply demands through 2030;
- Implementation of the Chino Basin Dry Year Yield Program consistent with the contractual shift obligations of the participating agencies of up to 33,000 acre-feet in a twelve month period; and
- A 10% conservation rate is achieved during drought scenarios.

The conclusion of the 2005 UWMP is that the retail agencies within IEUA's service area will be able to meet 100% of their demand under every scenario.

Other Water Planning Issues

Protection and enhancement of water quality is a priority within IEUA's service area. Overall, water quality is excellent but there are isolated zones of poorer quality groundwater that require some water sources be blended or treated to meet drinking water quality standards. Agencies within IEUA's service area have developed proactive programs to identify and treat poorer quality water to ensure the continued reliability of the local water supplies.

Planning for water shortages and catastrophic interruptions are also a priority within IEUA's service area. Regional coordination, infrastructure connections, local ordinances and mutual aid programs have been developed to minimize the potential for interruption of water supplies.

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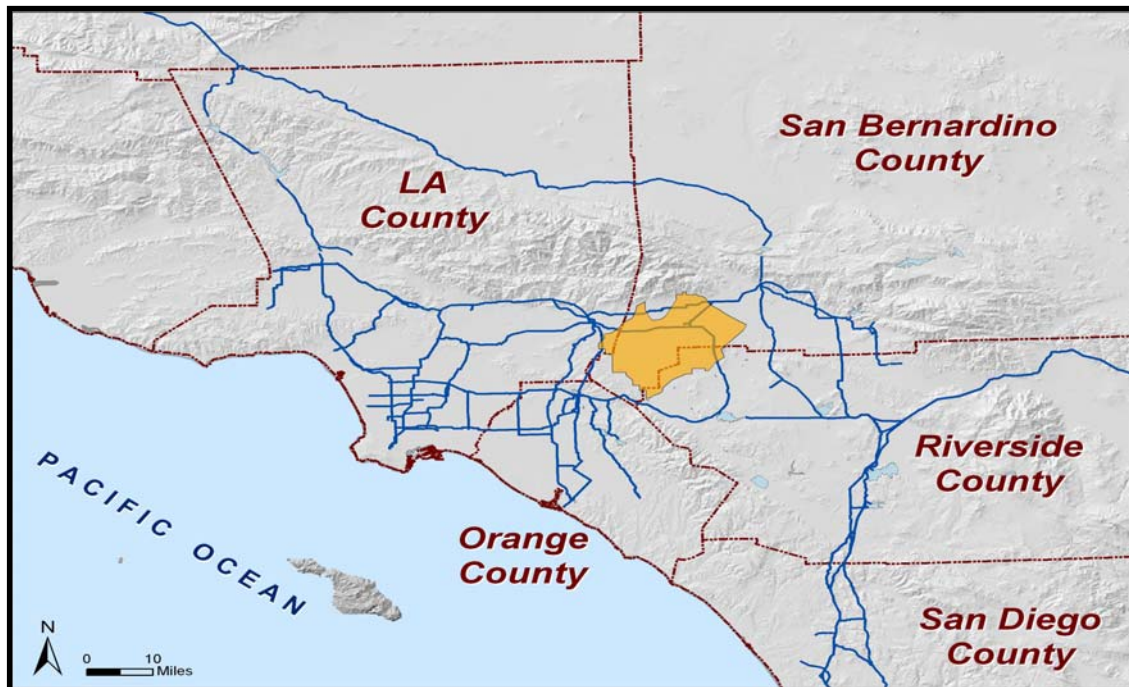
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CHAPTER 1

INTRODUCTION

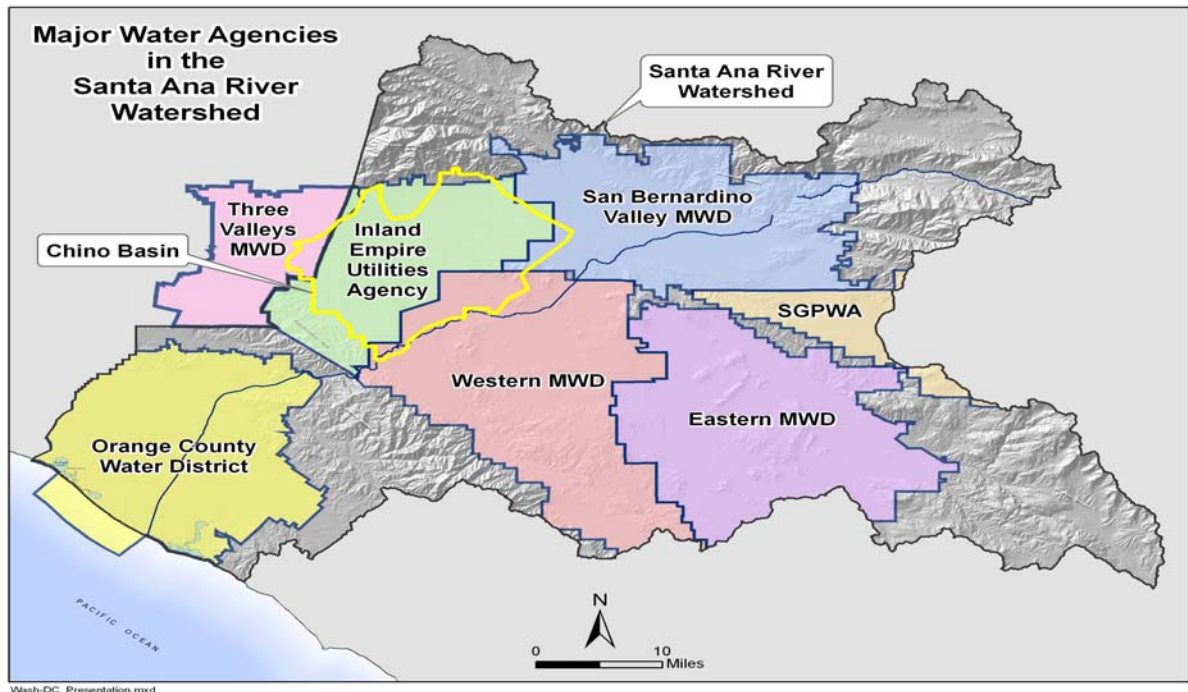
The Inland Empire Utilities Agency distributes imported water to retail agencies, provides industrial/municipal wastewater collection and treatment services and other related utility services for the western portion of San Bernardino County (see Figure 1-1). The Agency's service area is located in the southwestern section of San Bernardino County in the Santa Ana River Watershed (see Figure 1-2). The 242 square mile service area encompasses the Chino Groundwater Basin, which consists of a relatively flat alluvial valley from east to west and slopes from north to south at a one to two percent grade. Valley elevation ranges from about 2,000 feet in the foothills below the San Gabriel Mountains to about 500 feet near Prado Dam.

Figure 1-1
Location Map of Chino Basin



The Santa Ana Watershed is the fastest growing area in the United States (current population of 4.5 million is projected to increase by 2 million over the next 25 years). Rapid urban growth will require careful water resources planning and management to ensure adequate water supplies and address water quality management problems.

**Figure 1-2
IEUA Boundary Map**



The Urban Water Management Plan 2005 was prepared by Inland Empire Utilities Agency staff and describes a regional approach to the management of imported and local water supplies in the Chino Basin service area. The IEUA Urban Water Management Plan provides guidance to help local agencies to:

- Coordinate water conservation programs in a cost effective manner;
- Maximize the beneficial use of recycled water and utilization of local groundwater supplies.
- Reduce the need for imported supplies from MWD;
- Coordinate the implementation of the Chino Basin Optimum Basin Management Plan (OBMP) to ensure efficient water resources management;
- Develop a “drought-proofing” and with emergency outage strategy for the region; and
- Provide an integrated and comprehensive strategy for water and wastewater infrastructure development consistent IEUA’s 10 Year CIP, wastewater and Recycled Water Master Plan.

1.1 URBAN WATER MANAGEMENT PLANNING ACT

The Inland Empire Utilities Agency Urban Water Management Plan 2005 (Plan) has been prepared consistent with the State of California Water Code Sections 10610 through 10656, known as the Urban Water Management Planning Act (Act).

Originally enacted in 1983, the Act requires that every urban water supplier (providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually) prepare and adopt an urban water management plan. The Act requires urban water suppliers to prepare plans that describe and evaluate reasonable and practical efficient water uses, recycling and conservation activities. These plans must be filed with the California Department of Water Resources every five years. The deadline for filing the 2005 plan is December 31st of this year. (IEUA adopted its last UWMP in December 2000).

Since 1983, many amendments have been added to the Act. (The most recent occurring in 2004). These amendments require additional actions addressing urban water management plan preparation and consideration of such issues as metering, drought contingency planning, and water recycling. A copy of the Urban Water Management Plan Act is included in Appendix A.

1.2 IEUA's 2005 URBAN WATER MANAGEMENT PLAN

The Inland Empire Utilities Agency (IEUA) prepared an Urban Water Management Plan in 2000 in compliance with the Act's 1990 amendment, which requires wholesale water providers write such a document (the Agency has prepared UWMP's every five years since 1985). This Plan is an update of IEUA's 2000 Plan. It includes a number of significant changes in the region's water planning and management activities that have taken place in the last five years, most notably the Dry Year Yield Agreement with Metropolitan Water District, the Chino Basin Recharge Master Plan, the IEUA Wastewater Facilities Master Plan (adopted in August 2002) and the IEUA Recycled Water Feasibility Study (2002) and the Draft Recycled Water Implementation Plan (2005).

IEUA's Urban Water Management Plan 2005 was prepared in consultation with the Metropolitan Water District of Southern California (MWD), the Santa Ana Watershed Project Authority (SAWPA), Chino Basin Watermaster (CBWM), Chino Basin Water Conservation District (CBWCD), Cucamonga Valley Water District, San Antonio Water Company, Fontana Water Company, Monte Vista Water District, the cities of Chino, Chino Hills, Montclair, Ontario, Rancho Cucamonga, and Upland, and the California Urban Water Conservation Council of which IEUA is a member.

The specific water management activities being undertaken by the IEUA service area retail water agencies are summarized in this UWMP. Detailed descriptions are documented in each retail agency UWMP. Information from this document will be available to all water agencies in the region to assist in the preparation of their UWMP.

1.3 DWR GUIDANCE

The Department of Water Resources (DWR) has provided detailed guidance to water districts in developing the 2005 Urban Water Management Plans. Appendix G has a copy of DWR's check list for preparing a UWMP in compliance with the water code. Additional information can be found on DWR's web page (www.water.ca.gov). IEUA staff followed the DWR guidelines and checklist in the development of this UWMP.

1.4 IEUA HISTORY AND SERVICE AREA

Inland Empire Utilities Agency was formed as a municipal water district by popular vote of its residents in June 1950 to become a member agency of the Metropolitan Water District of Southern California for the purpose of importing water. Since its formation in 1950, the Agency has significantly expanded its water and wastewater utility services. These include production of recycled water, distribution of imported and recycled water supplies, sewage treatment, co-composting of manure and municipal biosolids, desalinization of groundwater supplies and disposal of non-reclaimable industrial wastewater and brine.

The Agency serves the cities of Chino, Chino Hills, Ontario and Upland, as well as the Monte Vista Water District, the Cucamonga Valley Water District, the Fontana Water company and the San Antonio Water Company. Approximately 790,000 people reside in the Agency's service area. A five-member Board of Directors governs the Inland Empire Utilities Agency. Each Director is elected by division, Division 1 (Upland/Montclair); Division 2 (Ontario); Division 3 (Chino/Chino Hills); Division 4 (Fontana); Division 5 (Rancho Cucamonga), and serves a four-year term.

1.5 CLIMATE

IEUA's service area is located within the desert climate zone of Southern California. The region receives an average annual rainfall of about 15 inches. Monthly average temperatures range from a low of 67 degrees in January to a high of 95 degrees in July. Daily records show summer temperatures have been as high as 114 degrees. Table 1-1 shows monthly average Eto, (Evapotranspiration) rainfall, and temperature within IEUA's service area.

The principal drainage for the Chino Groundwater Basin is the Santa Ana River. It flows sixty-nine miles across the Santa Ana Watershed from its origin in the San Bernardino Mountains to the Pacific Ocean. The Santa Ana River enters the Basin at the Riverside Narrows and flows along the southern Chino boundary to the Prado Flood Control Reservoir where it is eventually discharged through the outlet at Prado Dam and ultimately to the Pacific Ocean. Year-round flow occurs along the entire reach of the Santa Ana River due to surface inflows at Riverside Narrows, discharges from municipal water recycling plants to the Santa Ana River, and rising groundwater.

**Table 1-1
IEUA Service Area Climate¹**

	Jan	Feb	Mar	Apr	May	June	
Standard Monthly Average Eto	2	2.28	3.43	4.62	4.99	6.04	
Average Rainfall (inches)	3.65	2.85	2.8	1.13	0.26	0.04	
Average Temperature (F°)	66.8	69.4	70.1	74.5	79.9	86.7	

	July	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average Eto	6.98	6.97	5.27	3.96	2.65	2.06	51.25
Average Rainfall (inches)	0.01	0.11	0.34	0.34	1.72	2.07	15.32
Average Temperature (F°)	95	94.4	91.3	83	73.6	68.3	79.4

¹Data provided by NOAA and CIMIS websites

1.6 RETAIL WATER AGENCIES WITHIN IEUA SERVICE AREA

Inland Empire Utilities Agency service area overlies almost entirely the Chino Groundwater Basin. The cities of Chino, Chino Hills, Montclair, Upland, Ontario, Rancho Cucamonga and Fontana and unincorporated areas within San Bernardino County within IEUA's boundaries. There are eight retail water agencies (Table 1-2) that provide water service to residents in the Agency's service area. IEUA is a wholesale water agency and does not provide any retail sales to other agencies.

Table 1-2
Water Agencies within IEUA Service Area

City of Chino	The City of Chino serves water to approximately 73,000 residents of the city and some unincorporated areas in San Bernardino County.
City of Chino Hills	The City of Chino Hills provides water to approximately 79,000 residents of the City within its 46 square mile service area. The City service area also includes small portions of Chino and Pomona.
Cucamonga Valley Water District	Cucamonga Valley Water District is a retail agency that provides water to approximately 160,000 residents within a 47 square mile area comprised mainly of the City of Rancho Cucamonga. The District also provides water to small portions of the cities of Upland, Ontario, Fontana and unincorporated areas of San Bernardino County.
Fontana Water Company	Fontana Water Company is a retail investor-owned utility company that provides water to approximately 160,000 residents mainly in the City of Fontana, and also serves portions of the cities of Rancho Cucamonga and Rialto, outside the Agency service area.
Monte Vista Water District	Monte Vista Water District is a county water district founded in 1927 that provides retail water services to a population of 46,500 in the City of Montclair, portions of the City of Chino, and unincorporated areas of San Bernardino County between Chino, Ontario, and Pomona. The District is also a wholesale water supplier to the City of Chino Hills, providing up to 21 million gallons of water per day.
City of Ontario	The City of Ontario supplies water to approximately 169,000 residents of the City and some unincorporated areas of San Bernardino County. The City of Ontario also serves a small portion of the City of Rancho Cucamonga.
San Antonio Water Company	San Antonio Water Company is a retail investor-owned utility company that provides water to approximately 3,150 residents in the unincorporated area of the City of Upland.
City of Upland	The City of Upland encompasses 15 square miles and serves water to approximately 73,000 residents.

1.7 REGIONAL WATER AGENCY COORDINATION

There are many agencies involved in water management within the Chino Basin. IEUA is working in cooperation with each of these agencies to achieve water supply reliability, water quality and watershed management goals for the Santa Ana River Watershed and the Southern California region.

Metropolitan Water District of Southern California (MWD)

IEUA is a member of the Metropolitan Water District of Southern California (MWD). MWD is a public agency that provides supplemental imported water from Northern California (State Water Project) and the Colorado River to 26 member agencies located in the coastal plains of Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura Counties. Nearly 90% of the population within these counties, about 16 million people, resides within MWD's 5,200 square mile service area. A map of MWD's service area is shown in Chapter 3, Figure 3-5.

As a water wholesaler, MWD has no retail customers. It distributes treated and untreated imported water from the Colorado River and northern California (SWP) to its member agencies. MWD provides an average of 50% of the municipal, industrial and agricultural water used within its service area. The remaining 50% comes from local wells, local surface water, recycling, and from the City of Los Angeles' aqueduct in the eastern Sierra Nevada.

MWD prepares its own Regional Urban Water Management Plan (RUWMP). IEUA's UWMP was developed with the information provided from MWD's draft RUWMP (May 2005) and the final draft RUWMP (October 2005).

Finally, MWD provides financial support for local water projects and water conservation project implemented by its member agencies that contribute to an increase in the reliable regional water supplies available to the region. Currently, MWD sponsors two programs:

- The Local Resources Program (LRP) was established in June, 1998, to encourage the construction of recycled water and recovered groundwater projects. It replaces the longstanding Local Projects Program (LPP) and the Groundwater Recovery Program (GRP), originally established in 1982, and 1991, respectively. MWD currently provides a financial contribution of \$154 for each new acre-foot of water developed from local water recycling that replaces a demand on MWD's system. Local agencies may receive up to a maximum of \$250 per acre-foot of firm yield for groundwater recovery projects that treat contaminated groundwater and produce clean water. Participation in the program is through a competitive request for proposal (RFP) process that seeks to identify local projects that best meet the region's need and provide the greatest return on investment.

- MWD also provides financial and technical assistance to its member agencies for implementing the water conservation measures, known as Best Management Practices (BMPs), contained in the Urban Water Conservation Best Management Practices Memorandum of Understanding. The Conservation Credits Program was established in 1988. MWD pays the lesser of one-half the program cost or the equivalent of \$154 per acre-foot of water saved through conservation. A variation of this policy provides funding for ultra-low-flow toilet replacements programs at the flat rate of \$60 per toilet.

Santa Ana Watershed Project Authority

IEUA is a member of the Santa Ana Watershed Project Authority. Formed in 1972, SAWPA is a joint powers agency that coordinates regional planning within the Santa Ana Watershed to address water quality and supply improvements. SAWPA is comprised of the five major water supply and wastewater management agencies within the Santa Ana Watershed: Inland Empire Utilities Agency, Eastern Municipal Water District, Orange County Water District, San Bernardino Valley Municipal Water District and Western Municipal Water District.

Since the early 1970's, SAWPA has played a key role in the development and update of the Regional Basin Plan for the Santa Ana Regional Water Quality Control Board. SAWPA conducts water-related investigations and planning studies, and builds facilities needed for regional water supply, wastewater treatment, or water quality remediation. Current studies include the Chino Basin Water Resources Management Study, the Colton-Riverside Conjunctive Use Project, an investigation of water quality in Lake Elsinore, and studies on the nitrogen and organic carbon levels in the Prado Basin.

SAWPA administers the State Water Bond Act (Prop. 13) funds, approved in March, 2000, for the development of water quality and improvement projects within the Watershed. This Bond Measure provides significant funding for the construction of new water supply and treatment infrastructure within the region. Out of the \$235 million approved for the Santa Ana River Watershed, the Chino Basin has received approximately \$87 million for the construction of groundwater desalters, groundwater recharge facilities, and new wells.

Chino Basin Watermaster

IEUA is a member of the Chino Basin Watermaster Board of Directors. The Chino Basin Watermaster (Watermaster) was established in 1978, by a judgment entered by the Superior Court of California. The Judgment requires that the Watermaster develop a management plan for the Chino Groundwater Basin that meets water quality and water quantity objectives for the region.

In 1998, the Chino Basin Watermaster developed an integrated set of water management goals and actions for the Basin. Known as the Optimum Basin Management Program (OBMP), this document describes nine program elements to meet the water quality and local production objectives in the Chino Groundwater Basin

(See Chapter 6 – Groundwater Management Programs). The OBMP encourages the increased use of local supplies to help “drought proof” the Chino Basin.

In July 2000, the Watermaster’s planning process culminated with the adoption of a “Peace Agreement” that ended over 15 years of litigation within the Chino Basin. The Peace Agreement outlines the schedule and actions for implementing the OBMP.

Chino Basin Water Conservation District

The Chino Basin Water Conservation District (CBWCD) was established in 1949, to protect and replenish the Chino Groundwater Basin with rainfall and stormwater runoff from the San Gabriel Mountains. CBWCD uses an extensive system of percolation ponds and spreading grounds to augment the natural capacity of the region to capture runoff for the recharge of the groundwater basin. CBWCD also promotes water conservation through public education programs. IEUA works closely with the Chino Basin Water Conservation District. Figure 1-3 is a map of the Conservation District service area.

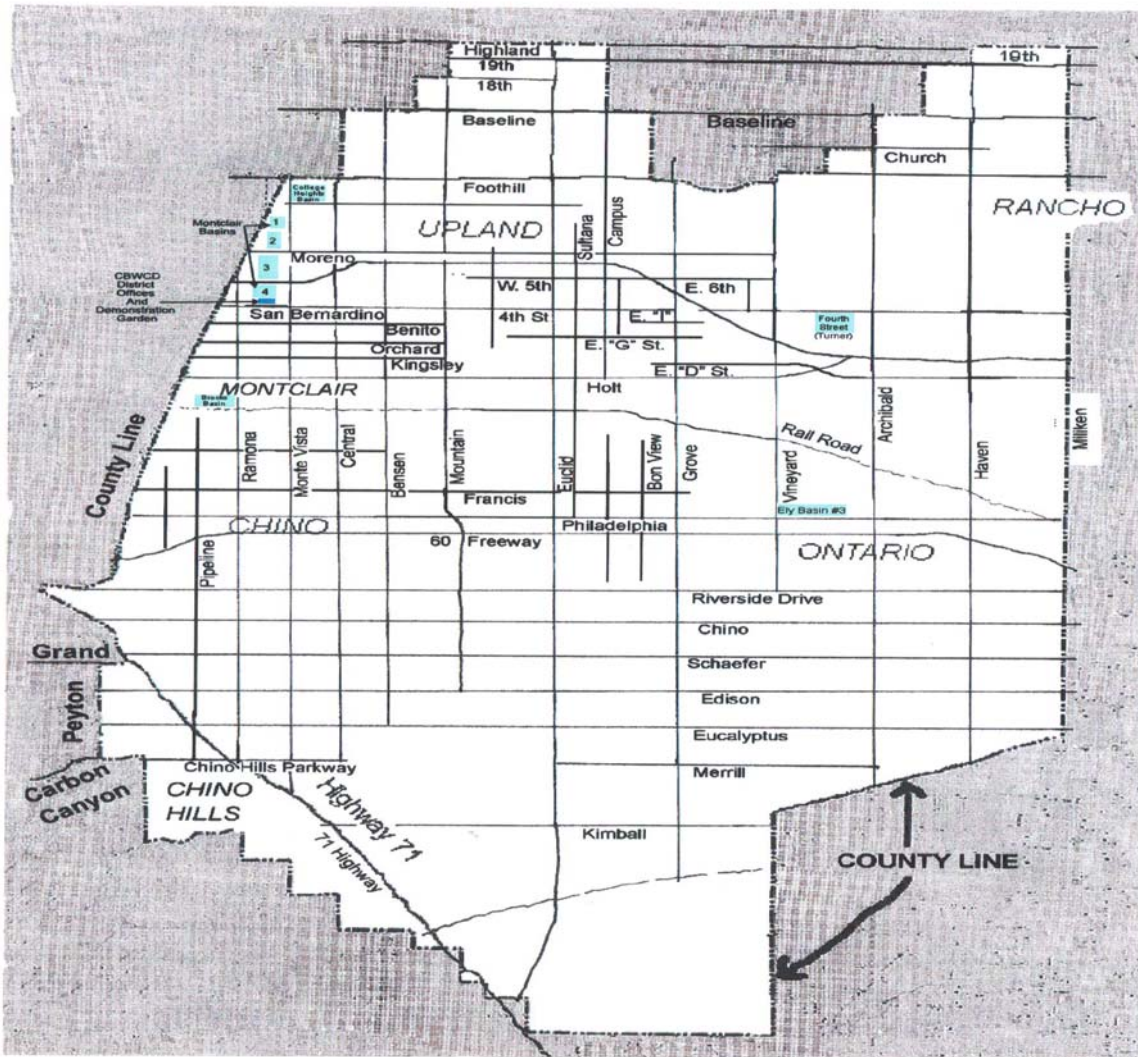
Santa Ana Regional Water Quality Control Board

The Santa Ana Regional Water Quality Control Board (SARWQCB) is responsible for the development and enforcement of water quality objectives to meet the requirements of the Federal Clean Water Act, California Porter-Cologne Act, and the National Pollution Discharge Elimination System (NPDES).

In 1975, the SARWQCB completed the Water Quality Control Plan (Plan) for the Upper portion of the Santa Ana Watershed. The plan outlined specific water quality management actions to address water quality and salt (total dissolved solids) build up within the Chino Groundwater Basin. These included the construction of a large well field and desalters in the lower part of the Basin to extract and treat poor quality water, the construction of a pipeline to export brines from the upper Basin to the ocean; and the use of large volumes of low TDS water for groundwater recharge.

Since 1975, a brine line (known as the Santa Ana River Interceptor or [SARI] line) has been built and is in operation. In addition, two groundwater desalting plants (Chino I and II) are in place. The 2000 Optimum Basin Management Plan by the Chino Basin Watermaster has been developed to meet the requirements of the 1975 plan.

**Figure 1-3
Service Area and Facilities of the
Chino Basin Water Conservation District**



Chino Basin Desalter Authority

The Chino Basin Desalter Authority (CDA) is a Joint Powers Authority consisting of the cities of Chino, Chino Hills, Norco and Ontario, the Jurupa Community Services District, the Santa Ana River Water Company and IEUA. The CDA operates and manages the Chino Desalter I and II. These desalter facilities consist of groundwater wells and associated raw water pipelines, treatment facilities, pumps and water distribution pipelines. Treatment facilities include treatment for volatile organic compounds, ion exchange and reverse osmosis. Each of the six retail water entities have entered into agreements to purchase desalter water.

Water Facilities Authority

The Water Facilities Authority (WFA) is a Joint Power Agency consisting of the cities of Chino, Chino Hills, Ontario and Upland and the Monte Vista Water District. The WFA purchases State Project Water from IEUA and it is delivered through the eastern branch of the California Aqueduct via MWD. The WFA treats this water at the Agua De Lejos Treatment Plant located in Upland. Treatment processes include flocculation and sedimentation, filtration, effluent distribution, and solids handling and waste wash-water processing. Chlorine is used in several of these processes for disinfection, taste and odor control, algae control, and color control.

San Bernardino County Flood Control District

The San Bernardino County Flood Control District (SBCFCD) is partnering with IEUA, Chino Basin Watermaster and Chino Basin Water Conservation District in implementation of the Chino Basin Groundwater Recharge Master Plan. The implementation is known as Chino Basin Facilities Improvement Program (CBFIP). The CBFIP includes modifications to several SBCFCD basins and flood control channels including the installation of five rubber dams and three drop inlet diversion structures to divert imported, storm and recycled water to 18 groundwater recharge sites.

1.8 COORDINATING ACTIONS

As required by amendments to the Urban Water Management Planning Act, water suppliers are required to send notifications to all cities and counties in the suppliers' service area that the Urban Water Management Plan is being updated and that they are invited to provide comments during the update process. In June 2005, IEUA sent out notices to the County of San Bernardino and the seven cities in the IEUA service area. Copies of the notifications are included in Appendix D.

IEUA is required to coordinate UWMP preparation with local and regional agencies by soliciting their input during the planning process for each UWMP. Table 1-3 provides a list of local and regional agencies and their level of involvement in preparation of this UWMP.

IEUA's 2005 UWMP is the result of integrating multiple local and regional planning documents from IEUA, Metropolitan Water District, Santa Ana Watershed Project Authority (SAWPA), Chino Basin Watermaster, and water supply plans from each of the local retail water agencies.

Table 1-3
Regional Agencies Involved In UWMP Preparation

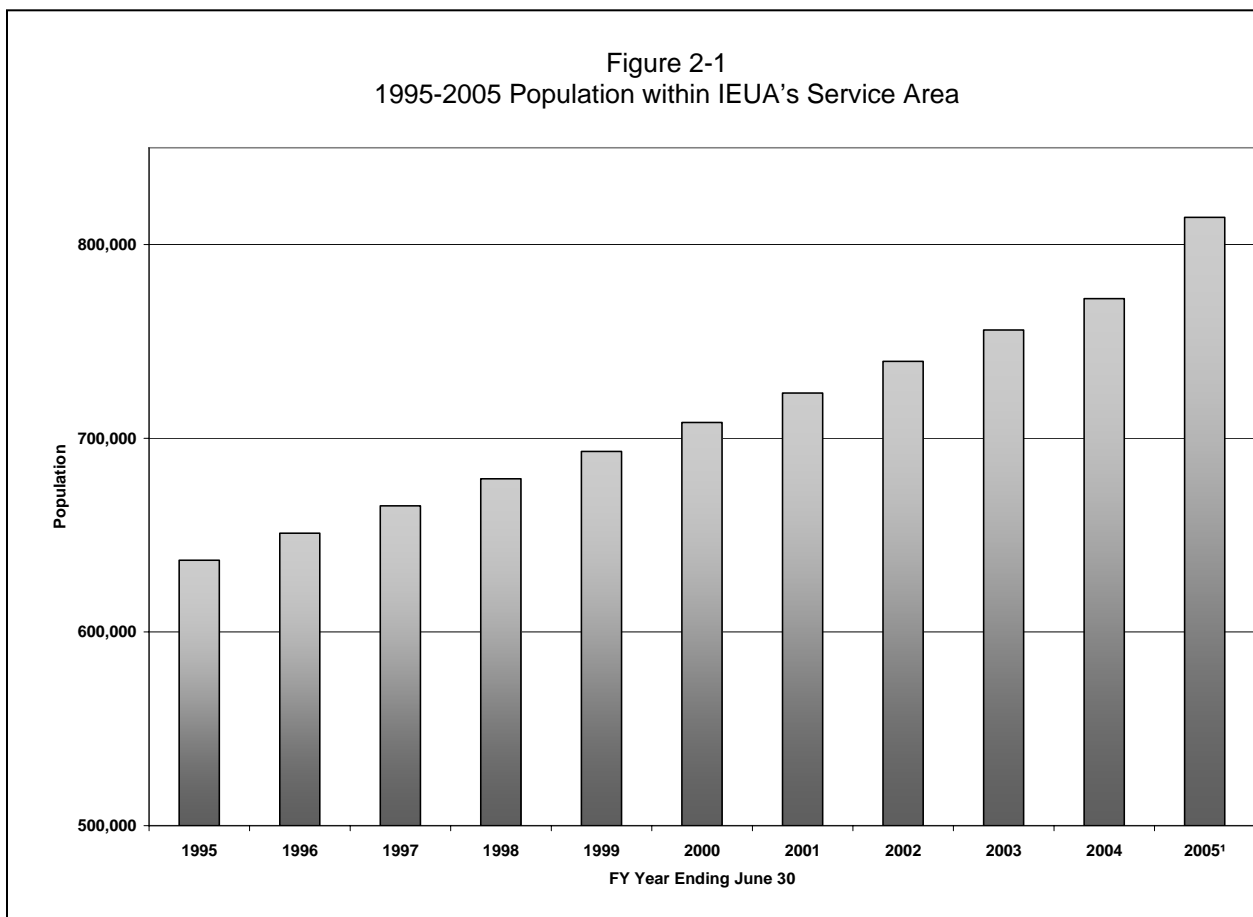
	Participated in UWMP Development	Commented on UWMP Draft	Attended Public Meetings	Contacted for Assistance	Received Copy of Draft UWMP	Sent Notice of Intention to Adopt
MWDSC	X			X	X	X
City of Chino	X	X	X	X	X	X
City of Chino Hills	X	X	X	X	X	X
City of Fontana	X				X	X
City of Montclair	X				X	X
City of Ontario	X	X	X	X	X	X
City of Upland	X			X	X	X
City of Rancho Cucamonga	X				X	X
Cucamonga Valley Water District	X	X	X	X	X	X
Monte Vista Water District	X	X	X	X	X	X
Fontana Water Company	X	X		X	X	X
San Antonio Water Company	X	X		X	X	X
Santa Ana Watershed Project Authority	X				X	X
Santa Ana Regional Water Quality Board	X				X	X
County of San Bernardino	X				X	X
Water Federation Authority	X	X		X	X	X
Chino Basin Water Master	X	X	X	X	X	X
Chino Basin Water Conservation District	X				X	X

CHAPTER 2

POPULATION, LAND USE AND WATER USE

2.1 PAST POPULATION AND WATER USE

IEUA's service area has experienced rapid growth over the past ten years (see Figure 2-1). In 1995, the population within the service area was approximately 635,000 people. By 2000, the area had grown to a population of about 708,000, and by 2005 to 814,000. This means that in ten years the population has grown at an annual rate of increase of 2.8%. Roughly 59% of this population growth (about 106,000 people)



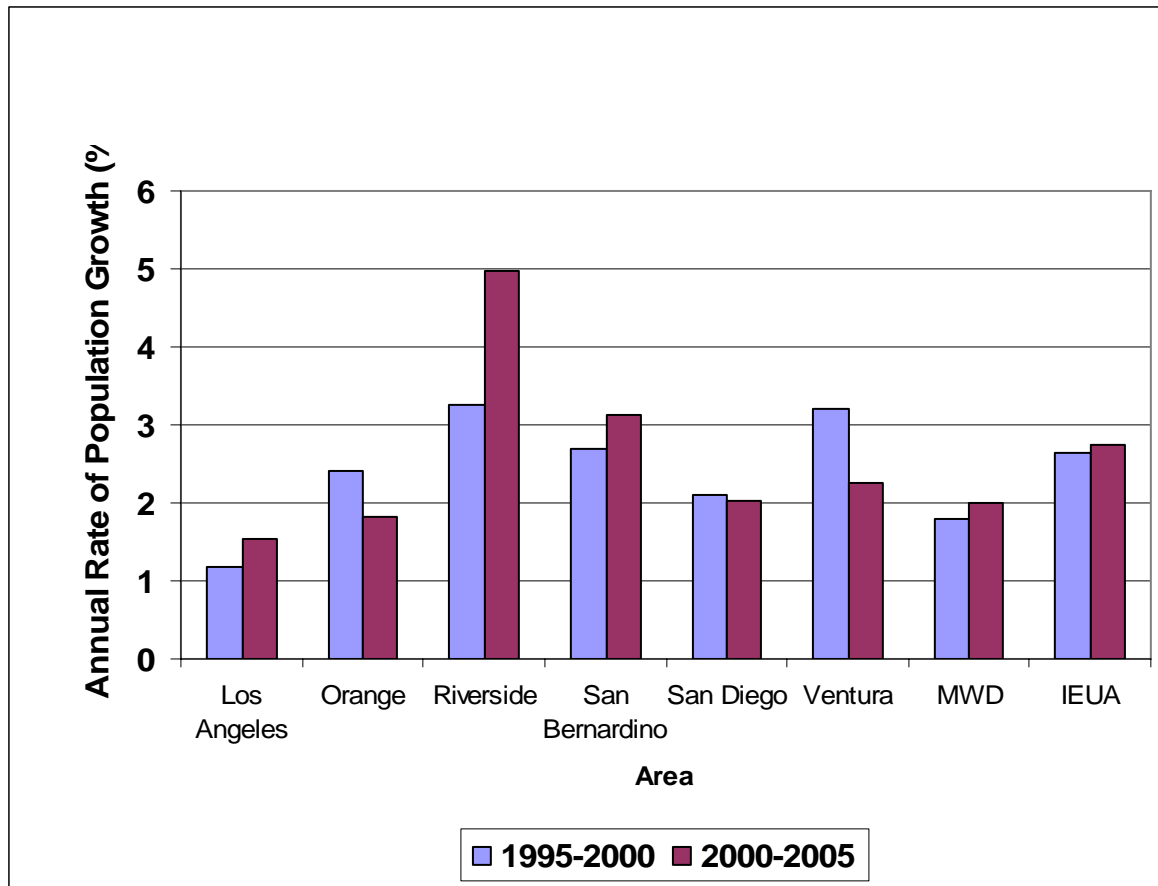
occurred between 2000 and 2005.

Source: MWD's 2005 RUWP

IEUA's service area is the most rapidly growing area within San Bernardino County (see Figure 2-2). The area's annual rate of growth is only exceeded by Riverside County which in the past five years has exceeded 5%. Within MWD's service area, IEUA's service area is experiencing one of the highest rates of growth. By contrast, Los

Angeles County has grown by less than 1.25% annually and Orange County at 1.5% over the same five year period.

Figure 2-2
Average Annual Population Growth
in MWDSC's Service Area



Source: MWD's 2005 RUWMP

The most populated cities within the service area are the cities of Ontario (169,125), Fontana (163,068), and Rancho Cucamonga, (169,855) as shown in Table 2-1. Over the past five years, the cities which experienced the most rapid annual growth were Rancho Cucamonga (5.5%), Fontana (5.3%) and Chino Hills (3.8%).

2.2 LAND USE TRENDS

In 1950, when IEUA was formed to distribute imported water supplies, the majority of the lands within its service area were used for field crops, citrus and vineyards. Urban areas constituted less than 8% of the total land use within the Chino Basin (see Table 2-2).

Table 2-1
1995-2005 Population by Communities within IEUA Service Area¹

	1995	1996	1997	1998	1999	2000
Chino	62,685	63,295	63,275	64,844	65,862	67,168
Chino Hills	47,791	49,689	51,982	54,966	58,271	66,787
Fontana	102,230	103,108	105,342	108,177	112,142	128,928
Montclair	29,731	29,923	30,058	30,298	30,625	33,049
Ontario	141,581	142,229	143,140	145,533	147,423	158,007
Rancho Cucamonga	114,587	115,768	117,294	119,068	122,221	127,743
Upland	65,940	66,133	66,450	67,377	68,112	68,393
Unincorporated	72,455	80,895	87,539	88,857	88,504	58,125
Total	637,000	651,040	665,080	679,120	693,160	708,200

	2001	2002	2003	2004	2005 ²
Chino	67,958	69,271	70,983	72,054	76,070
Chino Hills	68,798	71,532	73,366	76,401	77,819
Fontana	133,557	140,271	146,510	154,789	163,068
Montclair	33,553	34,130	34,478	34,729	51,930
Ontario	160,046	163,589	166,518	167,921	169,125
Rancho Cucamonga	131,709	138,211	147,394	154,780	169,855
Upland	69,592	71,066	72,183	72,709	73,235
Unincorporated	58,227	51,610	44,488	38,777	33,066
Total	723,440	739,680	755,920	772,160	814,168

¹1995-2004 data is from SCAG via MWD's Draft RUWMP, Sept 2005.

²2005 population data is an estimate taken from the local agencies UWMP's

Table 2-2
Land Use within Chino Basin

Land Use Category	1957	1975	1990	2001	+/- Change From 1957
Non-irrigated Field Crops and Pasture	10,486	8,610	593	542	-95%
Irrigated Field Crops and Pasture	29,993	22,472	21,064	19,006	- 37%
Irrigated and Non-irrigated Citrus	11,680	2,406	631	747	- 94%
Irrigated Vineyards	8,978	11,556	3,879	1,102	- 88%
Non-irrigated Vineyards	98	0	2321	1,362	+1390%
Native Vegetation	65,634	57,792	31,010	22,441	- 66%
Dairies and Feedlots	4,866	7,759	8,584	8,017	+ 61%
Total Non-urban	132,112	110,977	77,401	64,426	-51%
Urban Residential, Commercial, Industrial and Vacant	12,267	33,401	66,978	79,954	+652%
Special Impervious ¹	377	382	9319	11,209	+ 2973%
Total Urban	12,267	33,401	66,978	79,954	652%
Units of Measure: acres					

Source: Wildermuth Environmental Services

With its growing population, IEUA's service area has urbanized substantially since 1950. As shown in Figures 2-3 a-d, the agricultural lands located in the northern and central portions of the Chino Basin have been largely converted to residential, commercial and industrial uses. As of 2001, the total urban area within the Chino Basin had increased by 652% (from 12,300 acres to almost 80,000 acres) while agricultural lands (including dairies) had decreased by 51% (from 132,000 acres to 64,000 acres). Urban areas now constitute about 55% of the total land use within the Chino Basin.

Figure 2-3 a-d
1957-2001 Land Use Within Chino
Basin

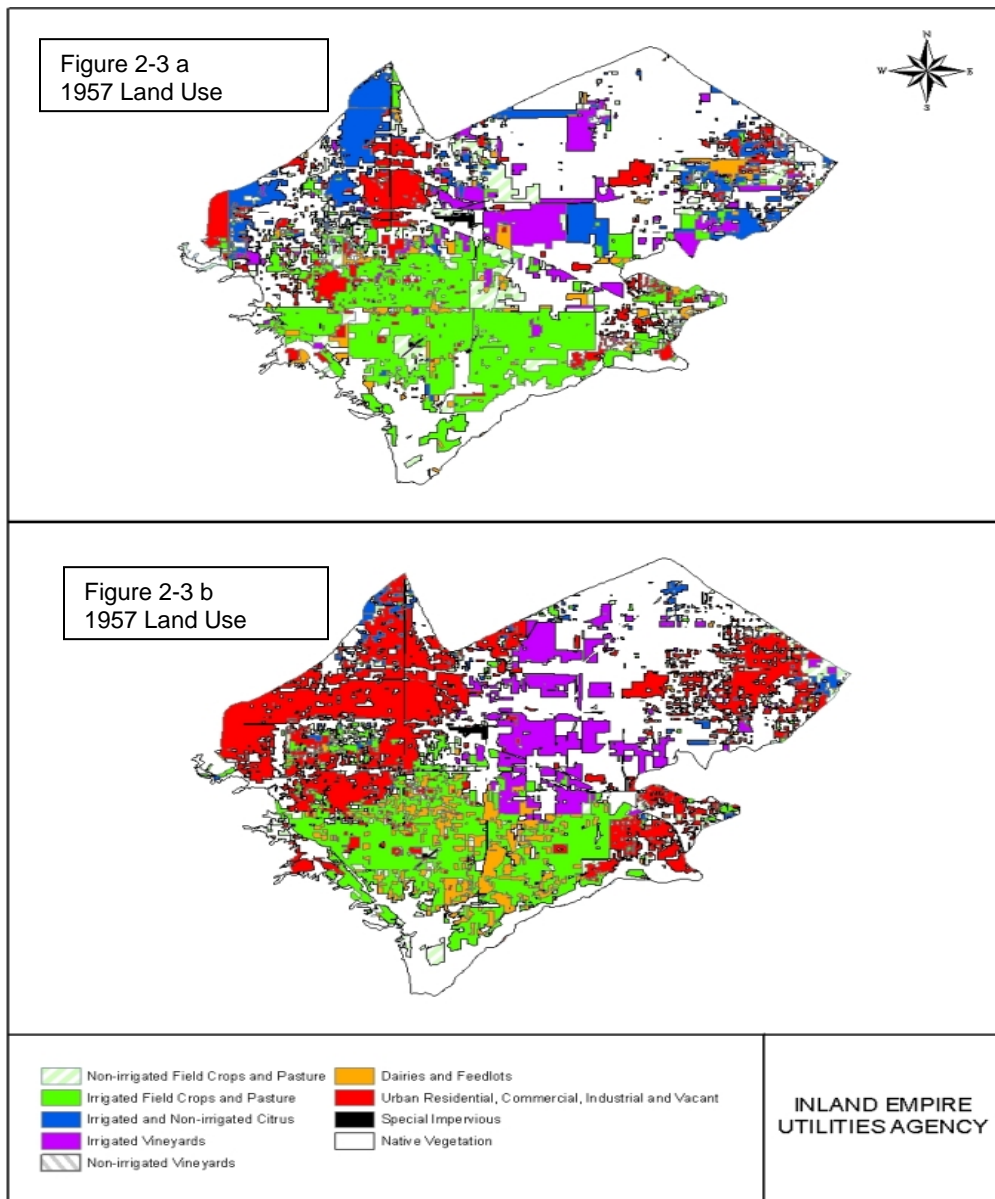


Figure 2-3 c
1990 Land Use

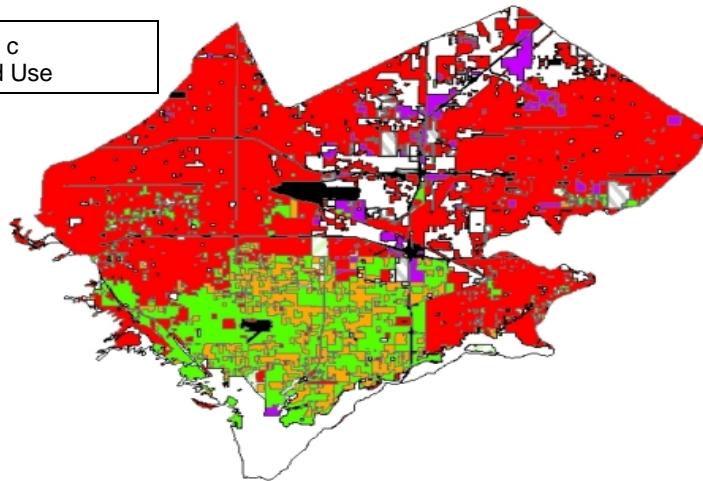
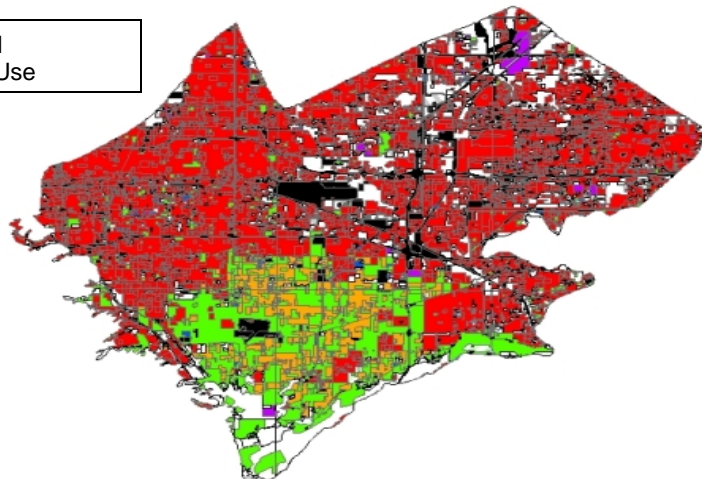


Figure 2-3 d
2001 Land Use



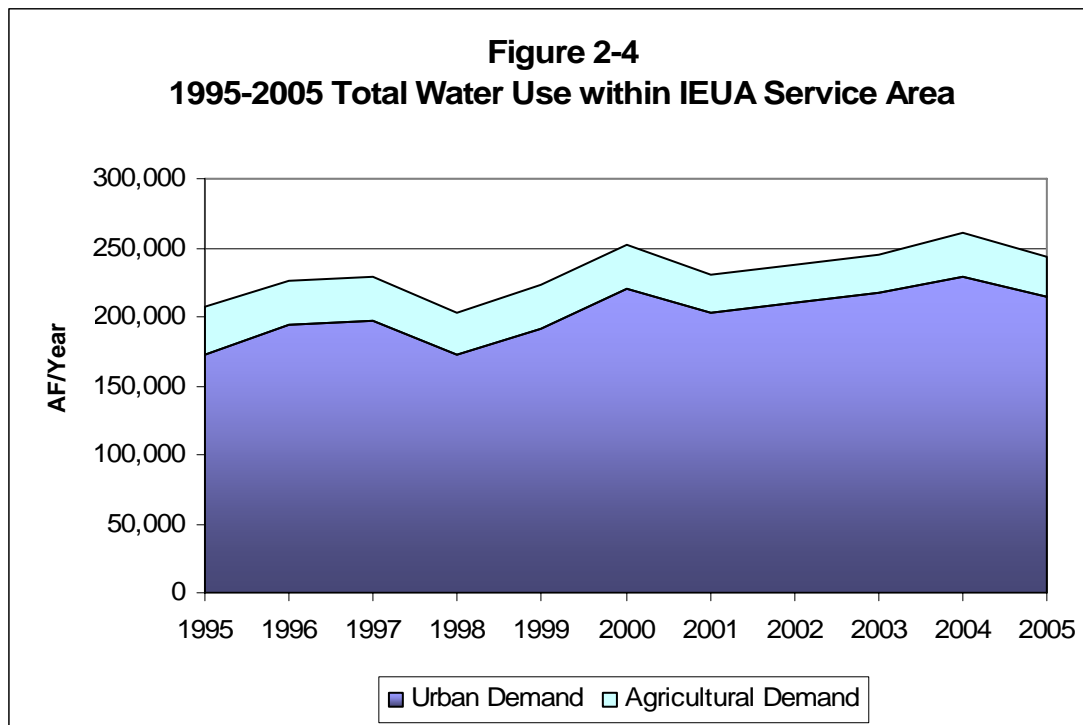
INLAND EMPIRE
UTILITIES AGENCY

2.3 PAST WATER USE

The majority of the water demand within the Agency's service area has historically been for urban (residential, commercial, industrial and institutional) uses. The remaining water has been used for agricultural purposes. In 2005, about 88% of the water demand was for urban use and 12% for agriculture.

The overall trend in the area's water demand in the past ten years has been one of growth, reflecting the increase in population and resulting urban uses (see Figure 2-4). Between 1995 and 2005, total water demand (urban and agricultural uses) within IEUA's service area grew about 36,000 acre feet (from approximately 208,000 acre-feet in 1995 to 244,000 acre feet in 2005). During the same period, the water used for agriculture declined from about 36,000 acre-feet year in 1995 to approximately 30,000 acre-feet per year in 2005, consistent with the conversion of these lands to urban development

However, in 2005, the trend towards increasing water usage was reversed. The 2005 total water demand was about 244,000 acre-feet, which is virtually the same amount of water used in 2000 despite significant growth in population over the five year period. Fiscal year 2005 was the second wettest year on record (within the last hundred years), which contributed to the reduced demand. In addition, regional conservation programs were significantly expanded during this five year period and contributed to the area's reduced water usage.



Source: IEUA 2005 UWMP, Table 2-3

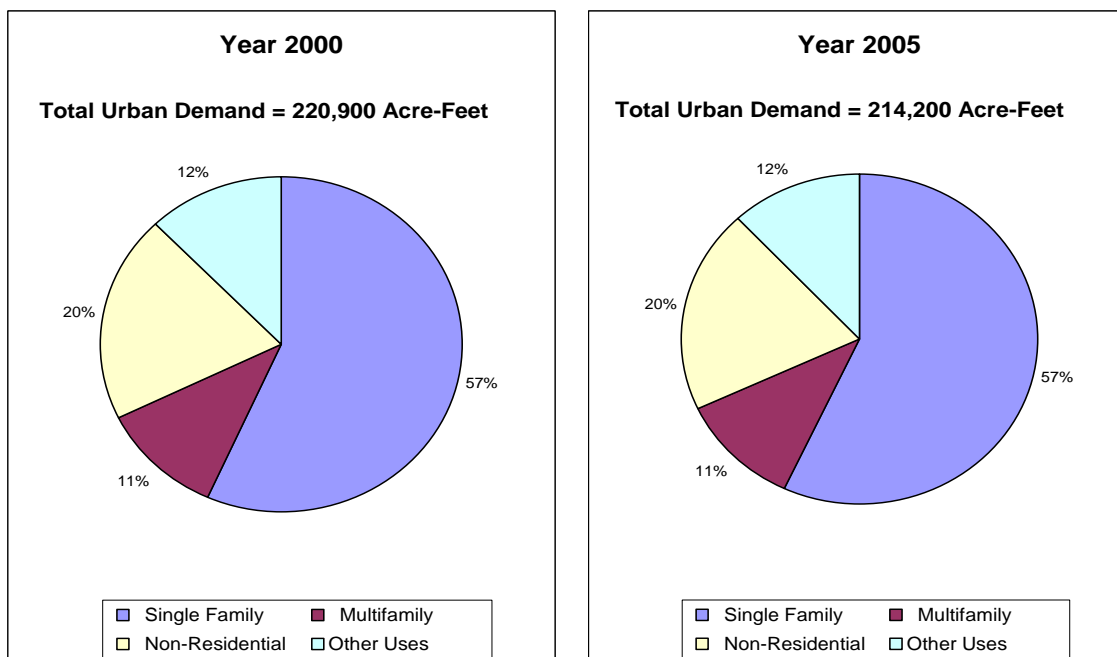
Overall, annual demand within the area has fluctuated with droughts and wet year cycles. The early 1990's were characterized by an intense drought (1988-1992) that sharply increased demand and then, as a result of the region's conservation efforts, decreased the area's water usage. Similarly, dry conditions prevailed between 2001 and 2003 and were followed by the extremely wet weather in late 2004 and early 2005.

All of the water used for urban purposes is distributed through the eight retail water agencies which serve the population within the area.* Water used for agricultural purposes is pumped directly from private wells.

The retail agencies that have the largest water demand within the service area are the Cucamonga Valley Water District (51,500 acre-feet per year), the city of Ontario (43,000 acre-feet per year) and the Fontana Water Company¹ (46,600 acre-feet per year) as shown in Table 2-3. The total urban water use for 2005 is estimated at 214,200 acre-feet.

Within the urban sector, more than half (57%) of the water used within IEUA's service area in 2005 is for single families (see Figure 2-5). The remaining demand is divided among non-residential (commercial/industrial) uses (20%), multifamily (11%) and unmetered uses and system losses (12%). (MWD assumes a leakage rate of 7.5% in the MWD-Main Model. The remaining 4.5% can be attributed to unmetered uses). These percentages are essentially consistent with 2000 urban sector uses.

Figure 2-5
Total Urban Water Demand by Sector of Use for 2000 & 2005



Source: Percentages for each sector are from MWD-Main tables.

¹ The Fontana Water Company (FWC) services a small area outside of the IEUA service area and gets additional supplies from San Bernardino Valley Municipal Water District. IEUA has reduced the FWC supply and demand numbers appropriately to more accurately reflect supply and demand within the IEUA service area.

Table 2-3
1995-2005 Water Demand by Retail Agencies
& Agricultural Water Use within IEUA's Service Area¹

Agency	1995	1996	1997	1998	1999	2000
City of Chino	12,638	13,695	14,556	13,003	14,252	15,764
City of Chino Hills	13,088	14,134	15,050	13,185	14,102	17,333
City of Ontario	37,551	41,401	42,866	38,841	42,614	46,420
City of Upland	19,871	21,318	21,730	18,397	20,653	23,038
Cucamonga Valley Water District	39,907	46,081	47,236	39,332	43,981	51,831
Fontana Water Company	33,120	35,979	38,448	33,928	37,907	44,317
Monte Vista Water District	10,525	11,250	11,818	10,138	12,076	11,924
San Antonio Water Company	5,169	9,695	5,515	5,588	5,992	10,257
Agricultural	35,966	32,941	31,814	30,775	32,336	30,993
Total³	207,835	226,494	229,033	203,187	223,913	251,877

Agency	2001	2002²	2003²	2004²	2005²
City of Chino	14,463	15,447	15,888	17,494	18,400
City of Chino Hills	16,608	15,242	16,567	18,402	16,726
City of Ontario	40,340	43,836	45,778	46,146	43,000
City of Upland	20,289	22,496	20,813	22,426	22,000
Cucamonga Valley Water District	48,536	50,669	49,737	55,119	51,500
Fontana Water Company	42,605	42,341	42,448	46,436	46,600
Monte Vista Water District	11,735	12,026	12,149	12,448	12,463
San Antonio Water Company	8,450	8,093	13,365	10,990	3,500
Agricultural	27,397	27,878	28,429	31,790	30,000
Total³	230,423	238,028	245,174	261,251	244,189

¹Data from Chino Basin Watermaster Assessment Tables. All values are fiscal year totals.

²Data from IEUA Annual Production Reports.

³Data for 2005 is estimated and does not include IEUA recycled water use.

2.4 PER CAPITA WATER USE

One measure of water efficiency is to estimate the average gallons of water used each day by each individual (gallons per capita daily, GPCD). It is important to note that per capita water use does not really reflect the amount of water actually used by an individual because the estimate includes all categories of urban water use, encompassing residential, commercial, industrial, fire suppression, and distribution system losses. Thus differences among communities, such as the percentage of residential and non-residential water uses, number and types of housing units, types of businesses, average number of people per household, average lots sizes, income level and climate, can all impact the average amount of water used per capita.

Table 2-4
1990-2005 Per Capita Water Use within IEUA's Service Area¹

Urban Per Capita Water Use in GPCD ²				
	1990	1995	2000	2005
IEUA	274	241	279	243

¹Data from IEUA retail demands (Table 2-3) and MWD (Table 2-1)

²Gallons Per Capita Per Day

In 2005, the per capita water use within IEUA's service area was 243 GCPD (see Table 2-4). This level is slightly lower than the estimates provided by MWD for San Bernardino County. As shown in Table 2-5, per capita water usage is higher in the hotter, inland areas than the cooler coastal communities. In addition, IEUA's service area includes water intense industries, such as steel making and fabric dying, which tend to increase per capita levels.

Table 2-5
Per Capita Water Use within MWDSC's Service Area

County	1990	1995	2000	2005
Los Angeles	188	167	175	171
Orange	231	196	205	192
Riverside	293	219	258	258
San Bernardino	273	213	*	255
San Diego	204	164	185	179
Ventura	227	179	198	205
MWD Total	208	177	*	187

Source: MWD Draft RUWMP (Sept. 2005).

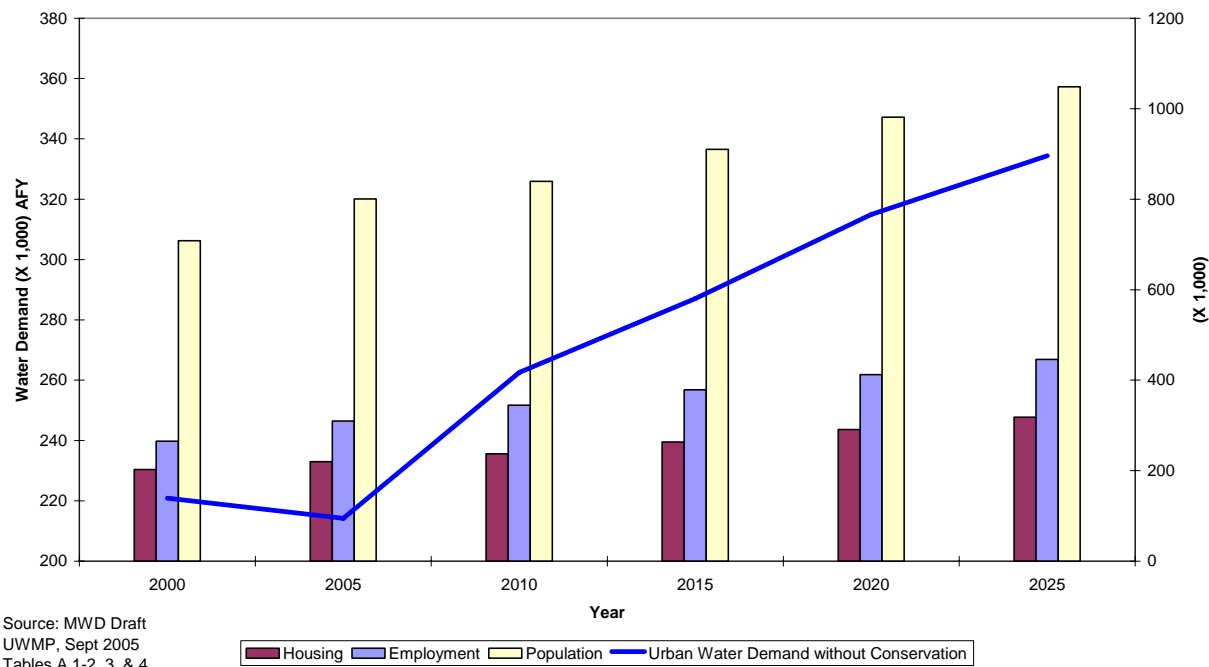
Since 1990, IEUA's per capita water usage has declined by about 30 GPCD. This suggests that water use within the area is becoming more efficient. This trend is consistent with the water use data for California and the nation as a whole, and reflects the effectiveness of improved water efficiency standards for appliances and the overall conservation efforts.

According to the Pacific Policy Institute of California², the state expects water use to continue to become more efficient as utilities implement efficiency programs. Presently, water use in the state is 232 GPCD. That number is expected to fall to 221 GPCD over the next 25 years representing a 4.6 percent decline.

2.5 FUTURE POPULATION AND LAND USE

The population within IEUA's service area is expected to continue to grow over the next twenty years, but at a lower average annual rate of increase than experienced in the last fifteen years. The projected population for the area in 2025 is about 1,050,000 people. This represents an increase of almost 260,000 people over the twenty year period, with an annual growth rate of 1.7%.

Figure 2-6
2000-2025 Population, Housing and Employment Projections for
IEUA's Service Area



² Water For Growth: California's New Frontier 2005, Public Policy Institute of California, Page 19.

Figure 2-6 presents projections for the IEUA service area for population, employment, and housing. The source for these data is the Southern California Association of Governments (SCAG) from MWD's Draft UWMP (Sept. 2005) and are utilized herein. The local agency data for the population comes from various sources and so are inconsistent. Therefore, IEUA has utilized SCAG data throughout the remainder of the chapter. Urban water demand projections come directly from the local agencies' UWMPs.

Employment within the service area is expected to increase by 136,000 jobs over the next twenty years. This corresponds to an average annual increase of 2.2%. Housing stock is expected to increase as well. Almost 100,000 units will be built and occupied over the next twenty years, representing average annual increase of 2.3%.

By 2025, the most populated cities within the service area are projected to be Ontario (270,000), Fontana (225,000), Rancho Cucamonga (240,000) and Chino (125,000). Annual growth rates within these communities are projected to be 3.0%, 2.1%, 3.0% and 3.4% respectively.

Table 2-6
2005-2025 Projected Population by Communities
within IEUA's Service Area¹

	2000	2005	2010	2015	2020	2025
CHINO	71,668	78,715	91,090	114,978	124,476	126,646
CHINO HILLS	66,787	77,819	80,126	81,916	83,636	85,284
FONTANA	148,928	174,968	179,426	195,373	211,105	226,186
MONTCLAIR ²	46,049	54,930	59,600	66,750	71,250	76,000
ONTARIO	158,394	172,408	203,811	225,385	248,424	273,047
RANCHO CUCAMONGA ³	142,743	178,855	203,870	220,180	233,400	242,700
UPLAND	70,393	73,235	73,600	73,700	73,800	73,900
SAN ANTONIO (unincorporated)	3,238	3,238	3,281	4,290	4,413	4,586
Total	708,200	814,168	894,804	982,572	1,050,504	1,108,349

MWD Estimates⁴	708,200	800,900	839,700	910,900	981,200	1,048,500
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¹Data sources from local agencies UWMPs are variable and include Department of Finance, municipal planning dept's, and interpolation.

²Data from Monte Vista Water District 2005 Draft UWMP. Includes Montclair, portions of Chino and unincorporated areas.

³Data from Cucamonga Valley Water District's 2005 Draft UWMP. Include Rancho Cucamonga and portions of Upland, Ontario, and Fontana.

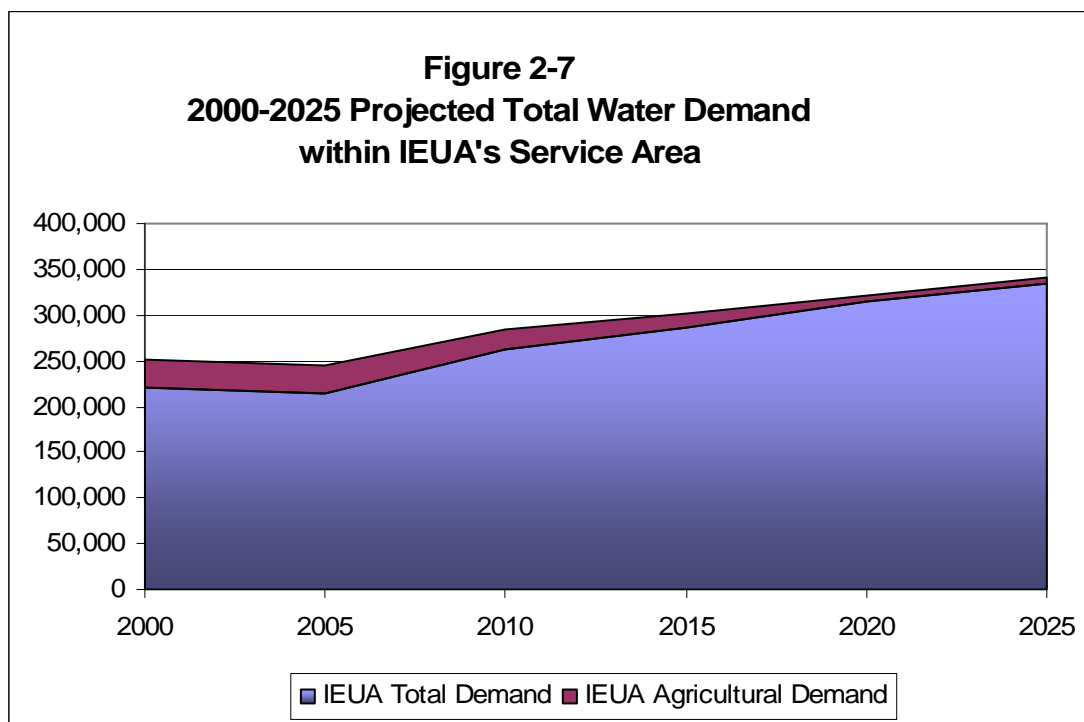
⁴SCAG data from MWD's Draft UWMP Sept 2005. For comparative purposes, unincorporated population included.

Anticipating the continued growth within IEUA's service area, the cities of Ontario and Chino have annexed dairy and other agricultural lands within the southern portion of the Chino Basin with the expectation that these areas will convert to urban uses. Similar annexations of unincorporated lands within the northern basin, particularly in the foothill areas adjacent to the cities of Rancho Cucamonga and Fontana are taking place. Many of these areas will become master planned communities, with predominantly single family, multi-family and commercial land uses.

Development in the southern most portion of the Chino Basin will be constrained by the Prado Basin flood plain. Lands below the 566 foot elevation are expected to remain in agriculture, open space or other land uses that are compatible with a potential 100 year flood on the Santa Ana River. While many of the region's dairies are transferring to other areas of the State or County, a portion of this industry is expected to remain in the Chino Basin.

2.6 FUTURE DEMAND WITHOUT ADDITIONAL CONSERVATION

Without additional conservation, total water demand (which includes agricultural production) within IEUA's service area over the next twenty years is expected to increase by approximately 97,000 acre-feet (from 244,000 acre-feet to about 341,000 acre feet per year, see Table 2-7)³. This represents a potential 39% increase in the area's projected water needs if no additional improvements in local water use efficiency occur during the next twenty years, including no increase in state and/or federal regulatory standards for water using appliances or processes, no local adoption of water efficiency standards for development and landscaping, and no implementation of new demand side management and conservation education programs within IEUA's service area.

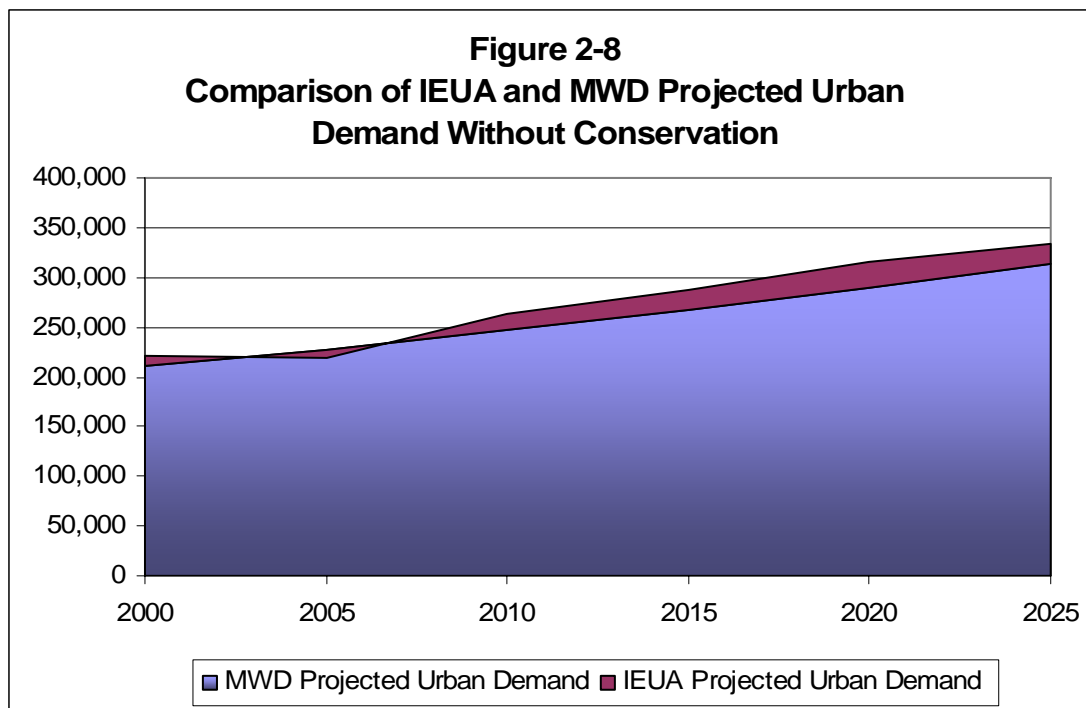


The conservative nature of these future demand projections are underscored when compared with the demand forecasts made by MWDSC for IEUA's service through its

³ The water demand forecasts used in preparation of IEUA's 2005 UWMP are based upon information provided by the respective retail agencies.

MWD-MAIN model (see Figure 2-8) (MWD RUMP, draft Sept. 2005, see Appendixes C & D). Overall, IEUA's urban water demand projections are up to 10% higher than those forecasted by MWD's model.

With the conversion of agricultural land to urban uses over the next twenty years, the percentage of water used in the area to meet urban demand will increase while the share of water used for agricultural purposes will decline. By 2025, urban water use is expected to be 98% of the water demand (about 341,000 acre-feet), while agriculture will use less than 2% (about 7,000 acre-feet).



By 2025, the retail agencies that are projected to have the largest water demand within IEUA's service area are the Cucamonga Valley Water District (at 86,000 acre-feet per year, a 67% increase above 2005 water usage), the city of Ontario (at 84,300 acre-feet per year, a 97% increase above 2005 water usage), and Fontana Water Company (at 66,000 acre-feet per year, a 43% increase above 2005 water usage) as shown in Table 2-7. Average annual rates of increase in the water demand being met by these retail agencies range from a low of 2.1% for the Fontana Water Company to a high of nearly 5% for the city of Ontario.

Total water demand in the IEUA service area includes water pumped from the Chino Groundwater Basin for agricultural purposes. Agricultural water production is provided because, presently, it is a significant use. Over the next twenty years as the region becomes even more urban, agricultural water production will decrease rapidly. Agricultural water use which is projected to decrease from 12 percent of total water use to 2 percent as the region becomes more urbanized. Much of the water pumped for agricultural production will instead be pumped for urban uses. Because agricultural water use will be limited in the Chino Basin, for the remainder of this chapter, water

demand will not include agricultural water production. Total projected urban demands are shown in Figure 2-8.

Table 2-7
Water Demand Projection by Local Retail Agencies ¹

	2000	2005	2010	2015	2020	2025
City of Chino	15,764	18,400	21,900	26,200	29,900	30,100
City of Chino Hills	17,333	16,726	22,700	24,700	25,400	26,400
City of Ontario	46,420	43,000	61,300	66,600	76,600	84,300
City of Upland	23,038	22,000	22,500	22,500	22,600	22,600
Cucamonga Valley Water District	51,831	51,500	65,400	72,500	79,500	86,000
Fontana Water Company	44,317	46,600	52,000	57,000	62,700	66,000
Monte Vista Water District	11,924	12,463	13,200	14,100	14,800	15,500
San Antonio Water Company	10,257	3,500	3,600	3,400	3,400	3,500
Subtotal	220,884	214,189	262,600	287,000	314,900	334,400
Agricultural Demand²	30,993	30,000	22,000	15,000	7,000	7,000
Total Demand³	251,877	244,189	284,600	302,000	321,900	341,400

	2000	2005	2010	2015	2020	2025
MWD M&I Demand⁴	212,000	226,600	246,700	267,200	289,900	312,800
Agricultural Demand	30,000	30,400	29,300	20,000	10,100	10,100
Total Demand	242,000	257,000	276,000	287,200	300,000	322,900

¹Demand projections taken from local agency's UWMPs

²OBMP Projections – Chino Basin Watermaster assumed portion in IEUA service area

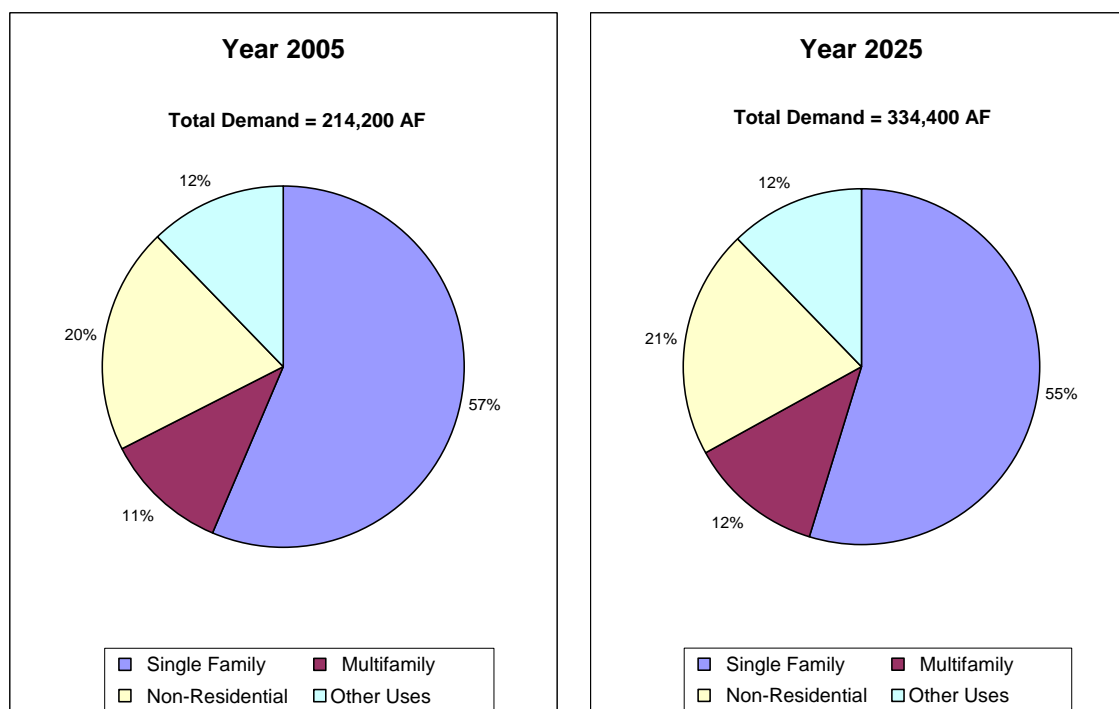
³Does not include conservation

⁴For comparison purposes – MWD Draft UWMP, Sept 2005, Table A.1.6

Without additional conservation, per capita water usage is expected to increase to more than 300 gallons per capita daily. See Table 2-9.

Within the urban sector, 55 percent of the water used within IEUA's service area by 2025 is forecasted for single family homes as shown in Figure 2-9. While three of the sectors remain relatively unchanged between 2005 and 2025, we see a decrease in single-family water use. Even though single-family homes are still being constructed at high rate (7,100 new homes in 2004), this decrease in water use percentage for single-family homes is probably due to the efficiencies that are being incorporated in all new homes throughout the IEUA service area. Since 67 percent of all urban water use in the IEUA service area is for residential dwellings (single-family and multi-family), this presents unique opportunities to expand conservation. For example, IEUA and the regional agencies will be initiating a program in 2006 to retrofit over 22,000 toilets in multi-family properties over a three-year period at no cost to the property owner.

Figure 2-9
Total Urban Water Demand by Sector of Use for Years 2005 and 2025



Source: Percentages for each sector are from MWD Main tables.

2.7 FUTURE WATER DEMAND WITH ADDITIONAL CONSERVATION

The service area's strong commitment to conservation and implementing water efficiency programs as part of its regional water management strategy is expected to substantially reduce projected water demands over the next twenty years. The retail water agencies in partnership with IEUA have adopted the goal of achieving a 10% reduction in the region's water use by 2010. By 2025, the region anticipates saving about 33,000 AFY, which will reduce actual water demand to 301,000 AFY (see Table 2-8).

The regional conservation program includes full implementation of the Conservation Best Management Practices plus additional programs and policies to ensure that all sectors of water use maximize water efficiency (see Chapter 4).

The impact of these conservation and recycled water programs can be seen in the reduction in the expected per capita water usage for the service area (see Table 2-9).

Table 2-8
2005-2025 Projected Water Demand with Conservation

	2000	2005	2010	2015	2020	2025
City of Chino	15,764	18,400	21,900	26,200	29,900	30,100
City of Chino Hills	17,333	16,726	22,700	24,700	25,400	26,400
City of Ontario	46,420	43,000	61,300	66,600	76,600	84,300
City of Upland	23,038	22,000	22,500	22,500	22,600	22,600
Cucamonga Valley Water District	51,831	51,500	65,400	72,500	79,500	86,000
Fontana Water Company	44,317	46,600	52,000	57,000	62,700	66,000
Monte Vista Water District	11,924	12,463	13,200	14,100	14,800	15,500
San Antonio Water Company	10,257	3,500	3,600	3,400	3,400	3,500
Subtotal	220,884	214,189	262,600	287,000	314,900	334,400
Projected Conservation Savings	4,500	8,600	26,260	28,700	31,490	33,400
Adjusted Projected Demand	216,384	205,589	236,340	258,300	283,410	301,000

Without additional conservation or recycled water development, per capita water usage is projected to increase from 239 GPCD to more than 300 GPCD. With regional conservation and recycled water programs, the per capita water usage within the service area is reduced to 223 GPCD, then rapidly decreasing as conservation and recycled water programs increase the local water supply. Even with the high growth rate the area is projected to see over the next 20 years, water use is expected to level off at 219 GPCD. The combination of conservation and water recycling programs are projected to reduce per capita water use by 85 gallons per day by 2025. At 219 GPCD, the region will be using less water than the projected state average of 221 GPCD.

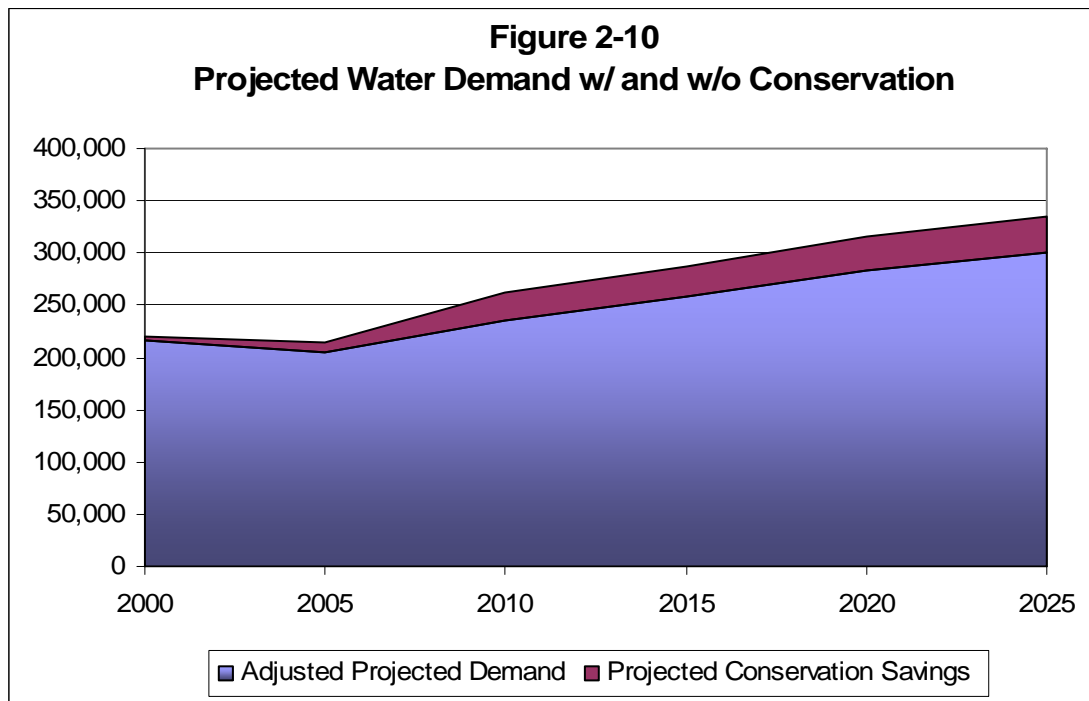
Table 2-9
2005-2025 IEUA Service Area Per Capita Demands¹

	2005	2010	2015	2020	2025
GPDC w/o Conservation & Recycled Water	239	279	281	286	304
GPDC with Conservation & Recycled Water	223	230	219	211	219

¹ All values calculated as projected water demand (Table 2-7) divided by MWD projected population.

2.8 FUTURE WATER DEMAND SUMMARY

Figure 2-10 summarizes future average water demands for IEUA's service area with and without conservation.

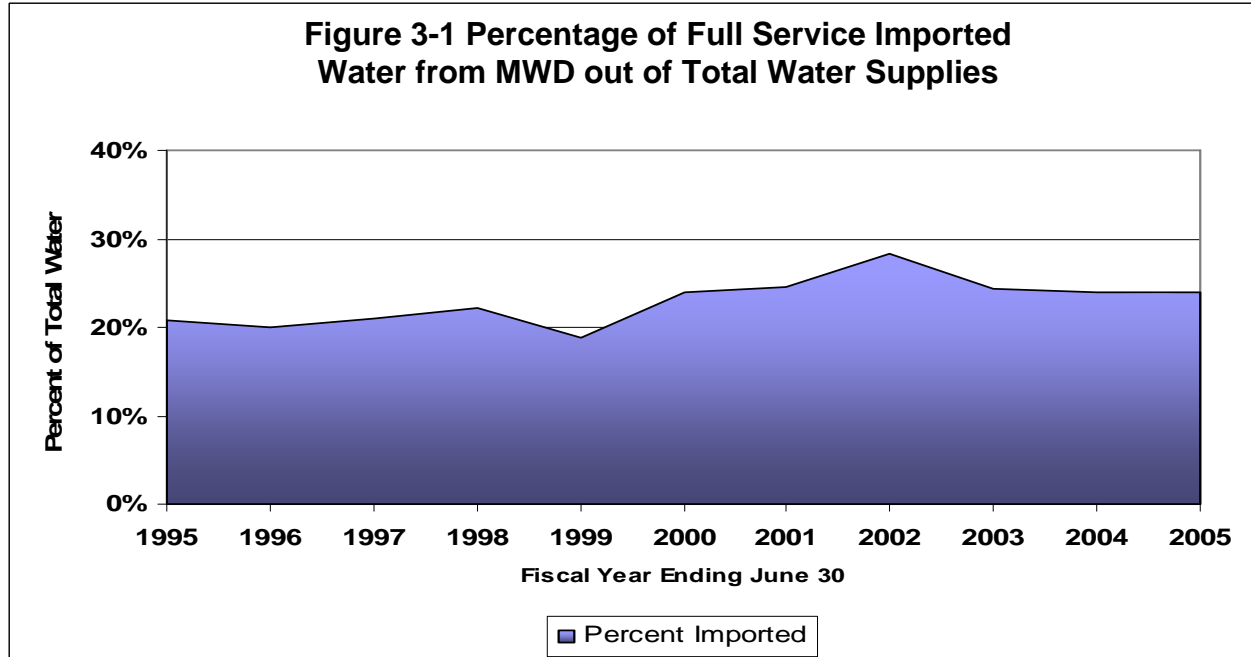


CHAPTER 3 WATER SUPPLIES

3.1 HISTORIC WATER SUPPLY TRENDS

The water used in IEUA's service area comes from both local and imported sources. Local sources include groundwater, surface water, desalinated water and recycled water. Imported water from northern California, delivered through the State Water Project¹, is purchased by IEUA from MWD for wholesale distribution to the retail agencies within IEUA's service area. Thus, a blend of ground, desalinated, surface, recycled and imported water is used to meet water demand.

When IEUA was formed in 1950, the water used within its service area was supplied exclusively from local groundwater and runoff from the San Gabriel Mountains. Over the next five decades, imported water deliveries steadily increased to help meet growing water demands within the area. By 1995, imported water supplied about 20% of the water demand in the service area, while local water sources supplied 80% of demand. During the past ten years, the percentage of imported full service water required to meet demand has increased to approximately 24% as shown in Figure 3-1. However, purchase of imported water was declined since 2002 reflecting the implementation of the regional integrated water strategy to maximize development of local supplies.



¹ MWD distributes water from both the State Water Project and from the Colorado River to its' 26 member agencies. However, IEUA uses only State Water Project water due to salinity concerns within the Chino Basin. This is consistent with the basin plan and regulatory requirements of the Santa Ana Regional Water Quality Control Board.

IEUA, in partnership with the area's cities and retail agencies along with Chino Basin Watermaster, Santa Ana Watershed Project Authority, Orange County Water District, Metropolitan Water District of Southern California, Santa Ana Regional Water Quality Control Board, and other neighboring cities and agencies, have been working since 2000 on an integrated water management strategy. The goals of the integrated water management strategy are to develop additional local water supplies that will reduce the area's dependence on imported water, help to "drought proof" the local economy, and improve water quality within both the Agency's service area and the Santa Ana River watershed. The primary sources of new local water that are being developed include:

- The Chino Basin Desalter that provides advanced treatment of groundwater using volatile organic compound treatment, reverse osmosis and ion exchange (also see Appendix T);
- Inland Empire Utilities Agency Regional Recycled Water Program using recycled wastewater (Chapter 5); and
- Chino Basin Optimum Basin Management Program which recharges the groundwater basin using recycled water, stormwater and imported water (Chapter 6) to increase groundwater production for municipal users.

Between 2000 and 2005, implementation of these programs resulted in an average 11,700 acre-foot per year increase in new local water supplies. The expansion of the Chino Basin Desalter I and construction of Chino Basin Desalter II (completion in January 2006) will expand the treatment capacity from 9,000 AFY to 27,000 AFY.

3.2 PAST AND CURRENT LOCAL SUPPLIES

The history of water use by source within the IEUA Service Area for the past ten years is presented in Table 3-1. Total water use ranged from a low of 204,446 acre feet in fiscal year 1998 to a high of 266,751 acre feet in fiscal year 2004. The relative contribution of ground, surface, imported, recycled, and desalter water is shown in Figure 3-2.

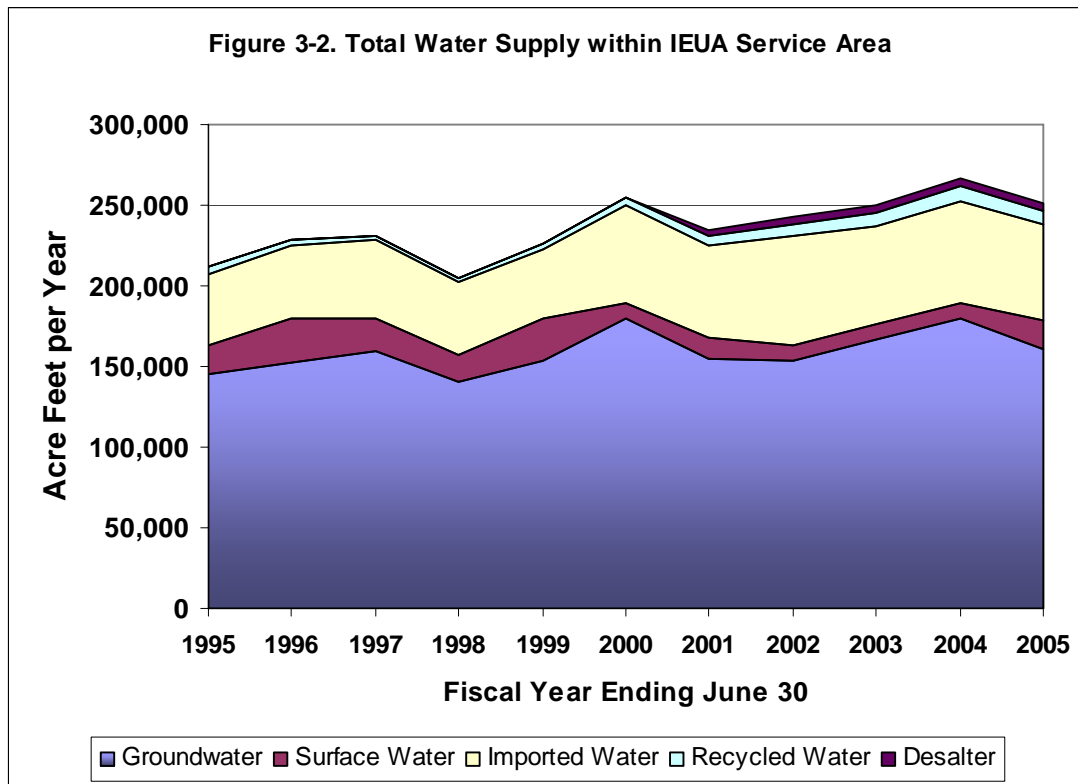
Groundwater is the predominate source of water used in the service area, approximately 63 to 70 percent of the total water supplies for the IEUA service area. Imported water was the next largest category, ranging from 19 to 28 percent of the water used in the service area. Surface water from the San Gabriel Mountains comprise a fairly small portion of the water used in the service area ranging from 4 to 12 percent of the annual supplies depending on wet and dry winters. Recycled and desalter water combined for about 1 to 5 percent of the water use in the service area.

Table 3-1
Total Water Production by Source Within IEUA Service Area (AFY)

Water Source	Fiscal Year Ending June 30					
	1995	1996	1997	1998	1999	2000
Chino Basin Groundwater	68,216	70,501	79,459	71,459	77,828	89,879
Other Basin Groundwater	41,288	49,074	48,570	37,658	43,950	58,618
Surface Water	17,635	27,365	19,978	17,189	25,973	9,924
Imported Water	43,838	45,694	48,403	45,415	42,724	60,892
Recycled Water ^a	4,687	3,212	2,884	1,950	3,647	4,660
Desalter	0	0	0	0	0	0
Agricultural groundwater use	35,986	32,941	31,814	30,775	32,336	30,923
Total	211,649	228,786	231,107	204,446	226,457	254,896

Water Source	Fiscal Year Ending June 30				
	2001	2002	2003	2004	2005
Chino Basin Groundwater	80,871	85,806	92,501	89,615	92,411
Other Basin Groundwater	45,989	39,964	45,876	42,377	28,125
Surface Water	13,543	8,903	9,554	9,058	18,061
Imported Water	57,545	68,560	61,027	63,776	60,192
Recycled Water ^a	5,703	6,768	7,576	9,264	8,049
Desalter	3,213	4,519	4,778	4,696	3,904
Agricultural groundwater use	27,397	27,878	28,429	31,790	31,790
Total	234,262	242,398	249,741	250,576	242,531

^aRecycled Water use by eight retail agencies and IEUA
Sources: Chino Basin Watermaster assessment table, WFA water Deliver, and retail agency records.

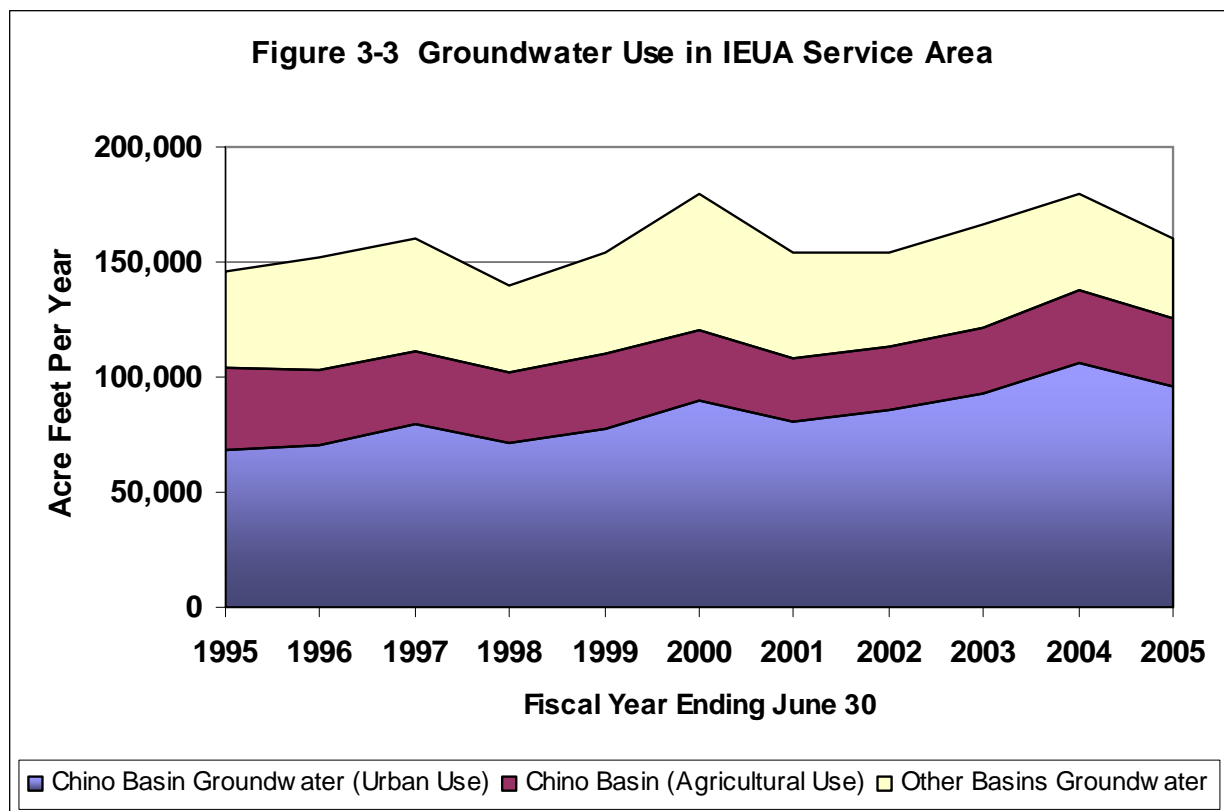


Groundwater supplies in the IEUA service area include:

1. Groundwater extracted from the Chino Groundwater Basin for municipal and industrial use, including recovered water by Chino Basin Desalter;
2. Groundwater extracted from the Chino Groundwater Basin for direct agricultural use via wells; and
3. Other groundwater basins (e.g. Cucamonga).

The volumes of each of these types of groundwater are shown in Figure 3-3. On average, about half (50%) of the groundwater used in the service area was from groundwater extracted from Chino Basin for municipal and industrial use. Agricultural use was about 22 percent of the groundwater used in the service area and 27 percent of the groundwater use in the service area was from groundwater basins other than the Chino Basin.

Water for conjunctive use and forbearance were received from MWD in the amount of 16,178 and 9,892 AF in 2004 and 2005, respectively. Imported water was reduced by this amount and Chino Basin Groundwater was increased by these amounts in 2004 and 2005.



Chino Basin Groundwater

The Chino Groundwater Basin is the largest groundwater basin in the Upper Santa Ana Watershed. It currently contains approximately 5 million acre-feet of water in storage, with an additional unused storage capacity of about 1 million acre-feet.² IEUA's service area covers 70% of the Chino Groundwater Basin as shown in Figure 3-4.

Water rights within the Chino Basin were adjudicated in 1978. The average safe-yield of the Basin is about 145,000 acre-feet per year. This water is allocated among three "pools" of users: the Overlying Agriculture Pool (82,800 acre-feet/year), the Overlying Non-Agricultural Pool (7,366 acre-feet/year) and the Appropriative Pool for urban uses (54,834 acre-feet/year). Additional groundwater production (in excess of the safe yield) is allowed by the adjudication provided that the pumped water is replaced with replenishment water.

Management of the Chino Groundwater Basin is guided by the 2000 "Peace Agreement" (see appendix W) of the Chino Basin Optimum Basin Management Program (OBMP, see Chapter 6). The Chino Basin Watermaster has held oversight responsibilities for the groundwater basin since its formation in 1978 with the adjudication of water rights.

Historically, Chino Basin Watermaster has purchased imported water from MWD (through IEUA) to provide replenishment water when pumping exceeds the safe yield of the basin. New sources of replenishment water now include local storm water and recycled water developed through the Chino Basin Groundwater Recharge Program (see Chapter 6). In addition, groundwater is re-allocated to the Appropriative Pool for urban use from the Overlying Agricultural Pool when it is not pumped by the agricultural users. Over time, as agricultural production declines within the IEUA service area, the reallocation of groundwater to the Appropriative Pool is expected to increase.

A market for the lease or sale of pumping rights within the Chino Basin is an important part of the management of this groundwater supply. Annual water exchanges occur regularly among agencies within IEUA's service area.

² Estimate of unused storage capacity based upon historic water levels in the Chino Basin.

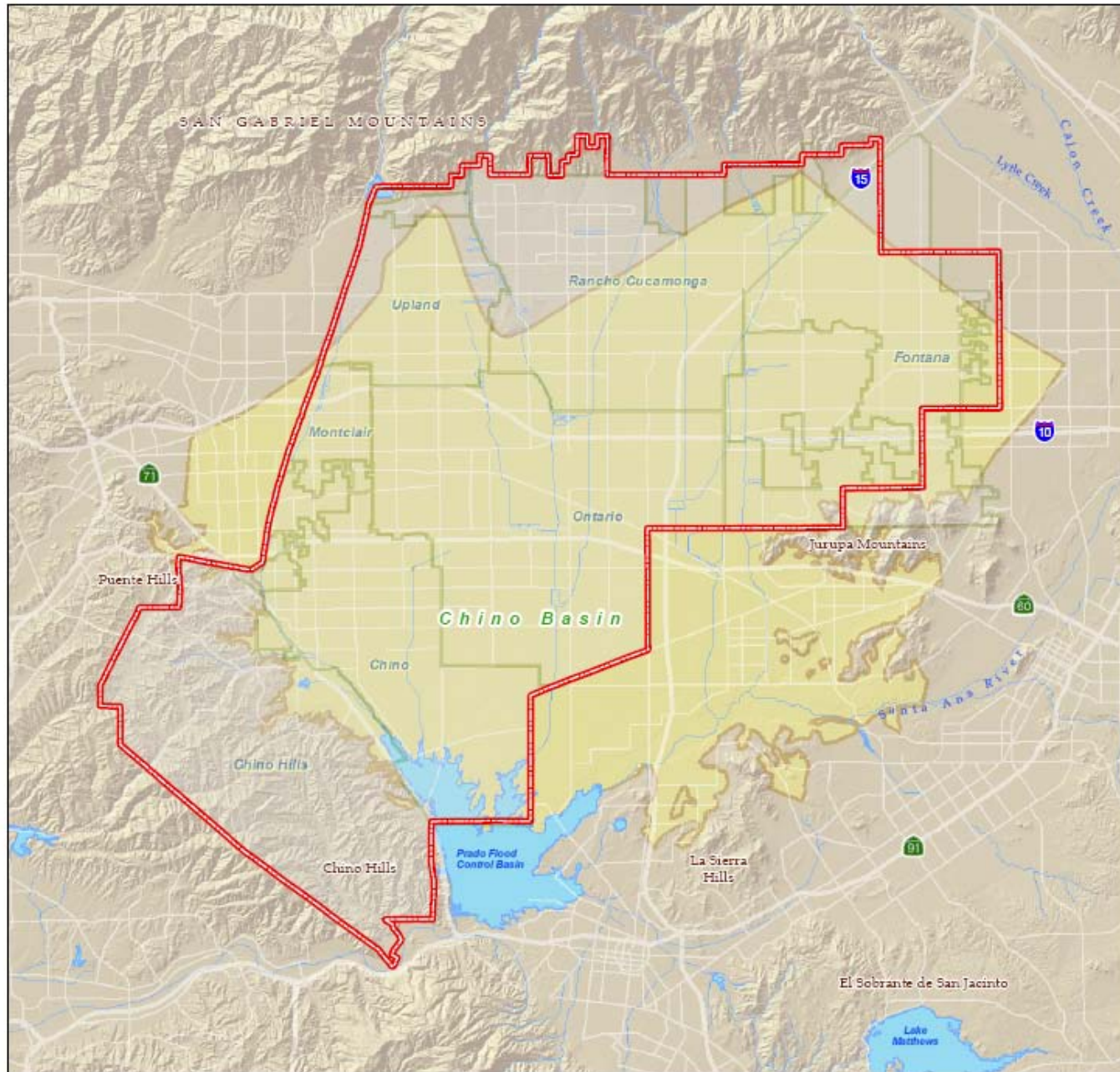
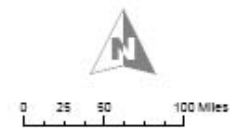


Figure 3-4

Chino Groundwater Basin and IEUA Service Area

Legend

- Stream
- Water Body
- Chino Basin (Outline)
- IEUA Service Area
- City



Groundwater quality in the lower Chino Basin is poor, as nitrates and Total Dissolved Solids (TDS) exceeding drinking water standards. Other water quality concerns include the presence of perchlorate, volatile organic chemicals and other contaminants in the Chino groundwater. Table 3-2 summarizes water quality analyses from water wells in the Chino Basin for the period of January 1999 through June 2004. Some of the contaminants are from natural sources (such as arsenic). Other contaminants were introduced by human activities, including weapons testing, the use and inappropriate disposal of solvents, and the application of fertilizer products. See Chapter 9 for more information on water quality.

Under the OBMP, the Chino Basin Watermaster is working in partnership with the cities, retail agencies, private groundwater pumpers, IEUA and Santa Ana Regional Water Quality Control Board (SARWQCB) to address these water quality problems and increase the water supplies available from the groundwater basin. The construction and operation of facilities to desalt the brackish groundwater (Chino Desalter I and II) along with the installation of well head ion exchange treatment facilities are a critical part of this strategy. In 2005, the State Water Resources Control Board approved the Maximum Benefit Plan for the management of the Chino Basin which will allow recycled water to be used with storm water and imported water to recharge the upper portion of the groundwater basin while requiring the operation of the desalting facilities to pump and treat the generally lower quality water in the lower portion of the Chino Basin.

Groundwater production from the Chino Basin is shown in Table 3-3. Total groundwater production from the Chino Basin has increased from 140,000 acre-feet per year in 1991 to an estimated 180,000 acre-feet per year in 2004.

Table 3-2
Summary of Water Quality Data for Groundwater
from Chino Basin January 1999 through June 2004

Analyte Group	Wells with Exceedances
Constituent	
Inorganic Constituents	
Nitrate	606
Total dissolved solids	479
perchlorate	128
Iron	75
Sulfate	69
Aluminum	57
Chloride	50
Managanese	40
Arsenic	12
Fluoride	11
General Physical	
Odor	14
Color	13
Chlorinated VOCs	
Trichloroethene (TCE)	101
1,2,3-trichloropropane	55
Tetrachloroethene (PCE)	30
1,1-dichloroethene	12
cis-1,2-dichloroethene	10
Radiological	
gross alpha	153
total radon	21

Source: Adapted from Chino Basin Watermaster, Optimum Basin Management Program, State of the Basin Report, July 2005

Table 3-3
Production of Chino Basin Groundwater (AFY) by Pool

Fiscal Year	Appropriative Pool	Overlying (Ag) Pool	Overlying (Non-Ag) Pool	Total
1975	70,312	96,567	8,878	175,757
1976	79,312	95,349	6,356	181,017
1977	72,707	91,450	9,198	173,355
1978	60,659	83,934	10,082	154,675
1979	60,597	73,688	7,127	141,412
1980	63,834	69,369	7,363	140,566
1981	70,726	68,040	5,650	144,416
1982	66,731	65,117	5,684	137,532
1983	63,481	56,759	2,395	122,635
1984	70,558	59,033	3,208	132,799
1985	76,912	55,543	2,415	134,870
1986	80,859	52,061	3,193	136,113
1987	84,662	59,847	2,559	147,068
1988	91,579	57,865	2,958	152,402
1989	93,617	46,762	3,619	143,998
1990	101,344	48,420	4,856	154,620
1991	86,658	48,085	5,407	140,150
1992	91,982	44,682	5,240	141,904
1993	86,367	44,092	5,464	135,923
1994	80,798	44,298	4,586	129,682
1995	93,419	55,022	4,327	152,768
1996	101,616	43,639	5,424	150,679
1997	110,163	44,809	6,309	161,281
1998	97,435	43,345	4,955	145,735
1999	107,723	47,538	7,006	162,267
2000	126,645	44,401	7,774	178,820
2001	113,437	39,954	8,084	161,475
2002	120,856	39,495	5,548	165,899
2003	121,587	37,457	4,823	163,867
2004	136,834	41,978	2,915	181,727

Source: Chino Basin Watermaster 27th annual report.

Chino Desalter Facilities

A second critical element to increasing Chino groundwater production is to reduce the salt imbalance within the basin. Consistent with the Optimum Basin Management Program (OBMP, 2000) and the Maximum Benefit Program (approved by the State Water Resources Control Board in 2005), desalting facilities must be constructed in the lower portion of the Chino Basin to remove salt and nitrates as well as to prevent poor quality water from the Chino groundwater basin from moving down the watershed into Orange County groundwater basins.

The Chino I Desalter was constructed in 2000 through a Joint Participation Agreement among five agencies: the Santa Ana Watershed Project Authority, Western Municipal Water District, Orange County Water District, Metropolitan Water District of Southern California and IEUA. Located in Chino, the facility currently produces 10,000 acre-feet per year of which approximately 9,000 acre-feet is used for potable purposes, serving an estimated 20,000 families within the cities of Chino and Chino Hills.

In 2002 the Chino Basin Desalter Authority, a Joint Powers Authority comprised of the cities of Chino, Chino Hills, Ontario, and Norco, the Jurupa Community Services District, and the Santa Ana River Water Company, was formed to manage the production, treatment and distribution of water produced by this facility (also see Appendix T). The Chino I Desalter is currently being expanded and is expected to produce between 14,000 and 15,900 acre-feet per year of water. This water will provide a supplemental supply to the cities of Chino, Chino Hills, and Ontario located within IEUA's service area as well as to the Jurupa Community Services District, City of Norco and the Santa Ana River Water Company located outside of IEUA's service area.

Other Groundwater

Local groundwater supplies from basins other than the Chino Groundwater Basin represent a significant supplemental source of water for the retail water agencies within IEUA's service area. These additional sources of supply include the Claremont Heights, Live Oak, Pomona, and Spadra Basins located in Los Angeles County; the Riverside South and Temescal Basins located in Riverside County; and the Colton-Rialto, Cucamonga, Lytle Creek, Bunker Hill, and Riverside North Basins located in San Bernardino County. The location of the other groundwater basins is shown on Figure 6-2 of Chapter 6.

IEUA's retail agencies that use groundwater from all or some of these basins include the City of Upland, Cucamonga Valley Water District, Fontana Water Company, and the San Antonio Water Company. Water from these basins also yield supplies for the City of Pomona, Southern California Water Company, West End Consolidated Water Company, Jurupa Community Services District, Western Municipal Water District, and West San Bernardino County Water District. The amounts of groundwater production used in the IEUA service area is presented in Table 3-4.

Table 3-4
Groundwater Supply from Other Basins Used Within IEUA Service Area (AFY)

Entity	Fiscal Year Ending June 30					
	1995	1996	1997	1998	1999	2000
City of Upland	10,383	13,036	14,705	11,478	14,071	17,406
Cucamonga Valley Water District	13,878	15,191	14,855	9,461	12,486	12,800
Fontana Water Company	14,276	14,536	16,104	15,062	14,566	18,985
San Antonio Water Company	2,751	6,311	2,906	1,658	2,827	9,428
Total Other Groundwater	41,288	49,074	48,570	37,658	43,950	58,618
Entity	Fiscal Year Ending June 30					
	2001	2002	2003	2004	2005	
City of Upland	11,684	10,609	7,532	10,930	2,874	
Cucamonga Valley Water District	8,200	7,461	7,191	5,468	8,351	
Fontana Water Company	18,826	15,871	19,714	17,267	15,811	
San Antonio Water Company	7,279	6,023	11,439	8,712	1,089	
Total Other Groundwater	45,989	39,964	45,876	42,377	28,125	

Source: Upland, CVWD and Fontana records.

Surface Water

Several of the retail agencies within IEUA's service area obtain a portion of their water supplies from local surface sources. These sources include San Antonio Canyon, Cucamonga Canyon, Day Creek, Deer Creek, Lytle Creek and several smaller surface streams. Production from surface supplies varies dramatically with year. During the past 10 years, surface water usage in the service area ranged from about 8,900 acre-feet per year in 2002 to 27,000 acre-feet per year in 1996 as presented in Table 3-5.

Table 3-5
Surface Water Supply Within IEUA Service Area (AFY)

Entity	Fiscal Year Ending June 30					
	1995	1996	1997	1998	1999	2000
City of Upland	3,345	3,334	2,353	1,257	4,115	346
Cucamonga Valley Water District	2,020	7,563	6,414	5,681	7,258	4,862
Fontana Water Company	9,936	13,084	8,835	6,418	11,487	4,180
San Antonio Water Company	2,334	3,384	2,375	3,832	3,113	536
Total Surface Water	17,635	27,365	19,978	17,189	25,973	9,924
Entity	Fiscal Year Ending June 30					
	2001	2002	2003	2004	2005	
City of Upland	1,999	1,499	1,155	1,364	467	
Cucamonga Valley Water District	4,770	3,361	3,550	1,785	5,087	
Fontana Water Company	5,675	2,905	3,127	3,642	2,742	
San Antonio Water Company	1,099	1,138	1,721	2,267	9,765	
Total Surface Water	13,543	8,903	9,554	9,058	18,061	

Source: Retail agency historical records.

Recycled Water

IEUA has produced and distributed high quality recycled water since 1972 when the Agency expanded its services to include regional wastewater treatment. Initially recycled water was delivered to a few large water users in the cities of Ontario and Chino. By the early 1990's, the Agency completed construction of the Carbon Canyon Recycled Water Plant which included distribution pipelines to serve additional customers in the cities of Chino and Chino Hills. In 1990, IEUA distributed 570 acre-feet of recycled water as a supplemental supply to these communities and this increased to about 9,000 acre-feet in 2004 as presented in Table 3-6 (see Chapter 5).

Currently, IEUA operates four regional recycled water plants that produce disinfected and filtered tertiary treated recycled water in compliance with California's Title 22 regulations. In aggregate, these facilities currently produce over 70,000 acre-feet of recycled water. IEUA completed the Inland Empire Utilities Agency Regional Recycled Water Implementation Plan in 2005 and is in the process of constructing Phase I of the recycled water distribution system. Current recycled water use is 8,000 acre-feet per year.

Table 3-6
Recycled Water Supply Within IEUA Service Area (AFY)

Entity	Fiscal Year Ending June 30					
	1995	1996	1997	1998	1999	2000
City of Chino					100	368
City of Chino Hills						129
City of Ontario	893	920	809	690	1,003	1,073
City of Upland						
Inland Empire Utilities Agency	3,794	2,292	2,075	1,260	2,544	3,090
Total Recycled Water	4,687	3,212	2,884	1,950	3,647	4,660
Entity	Fiscal Year Ending June 30					
	2001	2002	2003	2004	2005	
City of Chino	293	368	958	1,544	830	
City of Chino Hills	569	798	767	1,058	815	
City of Ontario	1,001	1,232	1,197	1,160	1,169	
City of Upland			88	0	0	
Inland Empire Utilities Agency	3,840	4,370	4,567	5,502	5,235	
Total Recycled Water	5,703	6,768	7,576	9,264	8,049	

3.3 CURRENT IMPORTED WATER SOURCES

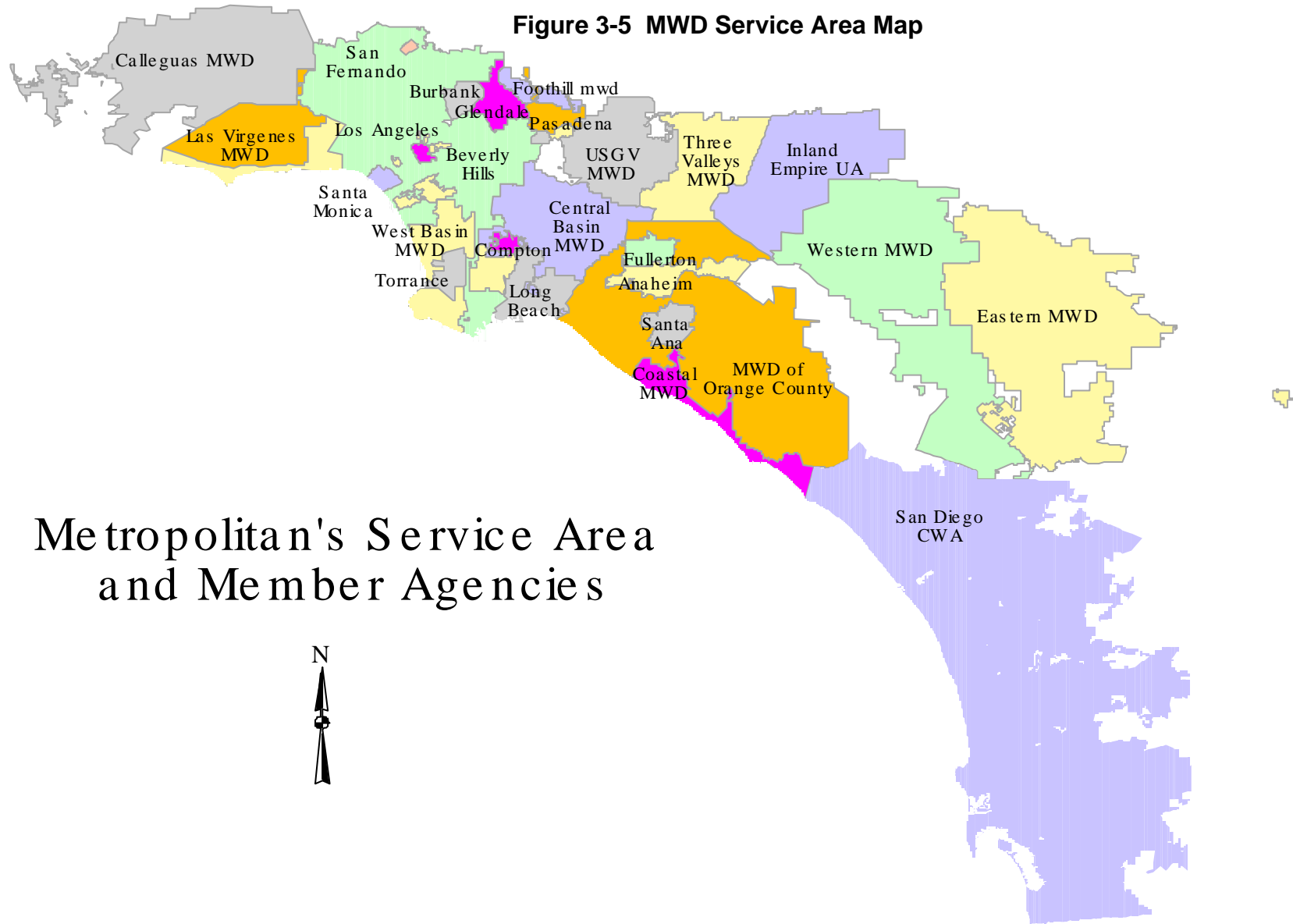
The Metropolitan Water District of Southern California (MWD) supplies imported State Water Project (SWP) water to IEUA for distribution throughout the agency's service area. MWD is a wholesale water agency that serves supplemental imported water from the SWP and the Colorado River Aqueduct (CRA) to 26 member agencies located within Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. Nearly 90% of the populations within these counties, about 18 million people reside within MWD's 5,200 square mile service area (see Figure 3-5).

MWD's Regional Urban Water Management Plan (draft 2005) provides a detailed description of its facilities and imported water supplies. MWD currently supplies an average of 50% of the total urban and agricultural water used within its boundaries. The remaining 50% comes from "local" sources provided by its member agencies, including groundwater, surface water, recycled water, and water from the City of Los Angeles' aqueduct located in the eastern Sierra ³

Historic MWD deliveries to the IEUA service area are shown in Table 3-7. IEUA received its first delivery of imported water in 1954. Firm full service imported water purchased by IEUA has grown from 3,000 acre-feet in 1953 to an average of about 60,000 acre feet since 2000. IEUA also purchases MWD water supplies for agricultural users (about 200 AF per year) and groundwater storage in the Chino Basin.

³MWD includes the Los Angeles Aqueduct interbasin transfer under local supplies.

Figure 3-5 MWD Service Area Map



Metropolitan's Service Area and Member Agencies

Table 3-7
MWD Historical Water Purchases by IEUA (AFY)

Fiscal Year	Full Service	Agricultural	Interruptible	Storage /1	Total
1954	3,135.0				3,135.0
1955	4,820.5				4,820.5
1956	5,033.3				5,033.3
1957	5,983.6				5,983.6
1958	6,850.3				6,850.3
1959	4,363.7	41.0			4,404.7
1960	3,568.1	83.0			3,651.1
1961	4,908.6	459.0			5,367.6
1962	6,416.4	796.0			7,212.4
1963	6,865.2	1,195.0			8,060.2
1964	14,598.7	1,579.0			16,177.7
1965	18,993.5	2,699.0			21,692.5
1966	13,422.2	2,154.0			15,576.2
1967	10,071.7	1,072.0			11,143.7
1968	10,883.8	1,681.0			12,564.8
1969	8,565.2	134.0			8,699.2
1970	7,262.5	370.0			7,632.5
1971	8,583.8	462.0			9,045.8
1972	9,611.7	660.0			10,271.7
1973	8,592.6	634.0			9,226.6
1974	8,427.7	800.0			9,227.7
1975	8,841.0	933.0			9,774.0
1976	9,474.0	1,842.0			11,316.0
1977	11,096.0	1,698.0			12,794.0
1978	20,357.0	924.0			21,281.0
1979	10,361.6	817.3	16,088.6		27,267.5
1980	11,196.0	69.4	7,841.4	10,677.6	29,784.4
1981	13,163.1	335.6	17,861.9	3,020.6	34,381.2
1982	7,837.4	588.1	25,914.6	2,453.7	36,793.8
1983	4,792.3	303.4	21,797.5		26,893.2
1984	4,727.6	404.2	21,230.0		26,361.8
1985	8,201.0	558.6	21,001.6		29,761.2
1986	9,150.3	398.4	24,701.0	1,072.5	35,322.2
1987	11,673.6	368.7	18,393.2	3,522.6	33,958.1
1988	9,728.8	459.0	12,245.1	13,142.2	35,575.1
1989	20,247.2	175.3	25,931.5		46,354.0
1990	15,773.0	117.8	26,156.5	26,616.5	68,663.8
1991	20,015.9	26.2	28,071.0	4,011.7	52,124.8
1992	31,924.5	152.0		75,976.1	108,052.6
1993	29,407.0	94.4		51,553.7	81,055.1
1994	28,897.1			28,046.9	56,944.0
1995	36,967.8	8.5		1,579.5	38,555.8
1996	35,204.1	77.4		4,408.8	39,690.3
1997	44,728.2	118.8		5,058.7	49,905.7
1998	39,320.6	83.8		11,895.1	51,299.5
1999	41,607.8	68.1		8,414.1	50,090.0
2000	57,070.3	104.1		5,332.1	62,506.5
2001	57,735.6	45.1		11,742.5	69,523.2
2002	64,996.0	44.0		9,006.3	74,046.3
2003	57,415.5	52.3		13,449.9	70,917.7
2004	64,024.7	49.3		7,582.0	71,656.0
2005	54,859.0	38.9	8,931.7	42,259.4	106,089.0

Source: Chino Basin Watermaster 27th annual report.

3.4 FUTURE WATER SUPPLY STRATEGY FOR IEUA'S SERVICE AREA

The goal of the IEUA UWMP is to maximize local water sources and minimize the need for imported water, especially during dry years and other emergency shortages from MWD. The integrated plan strives to achieve multiple objectives of increased water supply, enhanced water quality, improved quality of life, and energy savings.

Throughout the rest of this chapter, agricultural uses are not included in the discussion of future urban water supplies. Water for agricultural use is generally supplied by privately-owned groundwater wells (or in some cases recycled water). The adjudicated agricultural groundwater pool is more than enough to supply future agricultural demand for water. Future agricultural demand will decrease with time as agricultural land use areas are converted to urban land uses. Therefore, the analysis of future water uses focuses on urban water uses. A projected water supply from each of the retail agencies was collected from member agencies UWMP. Water supply projections throughout the rest of this chapter are primarily based on these data, IEUA recycled water availability information and CDA groundwater recovery production information.

Table 3-8 summarizes the projected urban water supply by source within IEUA's service area. Urban water use within the service area is projected to grow from 220,100 AFY⁴ in 2005 to 383,100 AFY in 2025. Imported water from MWD will decrease from 27 % in 2005 to 22% in 2025 of the water supplies. Figure 3-6 shows the projected imported water supply by agency. Recovered groundwater from the desalters and recycled wastewater make up a significant portion (about 83,200 AFY) of the water supply in the year 2025, while the remainder of the growth in water supply comes primarily from groundwater in Chino Basin and imported water.

Table 3-8
Projected Urban Water Supply In IEUA Service Area By Source (AFY)

Source of Water Use	Fiscal Year Ending June 30					
	2000 ^a	2005 ^b	2010	2015	2020	2025
Chino Basin Groundwater	89,900	94,600	130,900	143,700	157,800	165,000
CDA Supply (Chino Basin GW)	0	6,250	14,200	14,200	14,200	14,200
Other Basin Groundwater	58,618	32,800	32,800	33,600	33,700	33,700
Imported Water (Metropolitan)	60,892	60,200	68,800	74,300	80,600	82,500
Recycled Water	4,700	7,530	39,000	49,000	58,000	69,000
Local Surface Water	9,924	18,700	18,700	18,700	18,700	18,700
Total	224,000	220,100	304,400	333,500	363,000	383,100

^a Actual Values

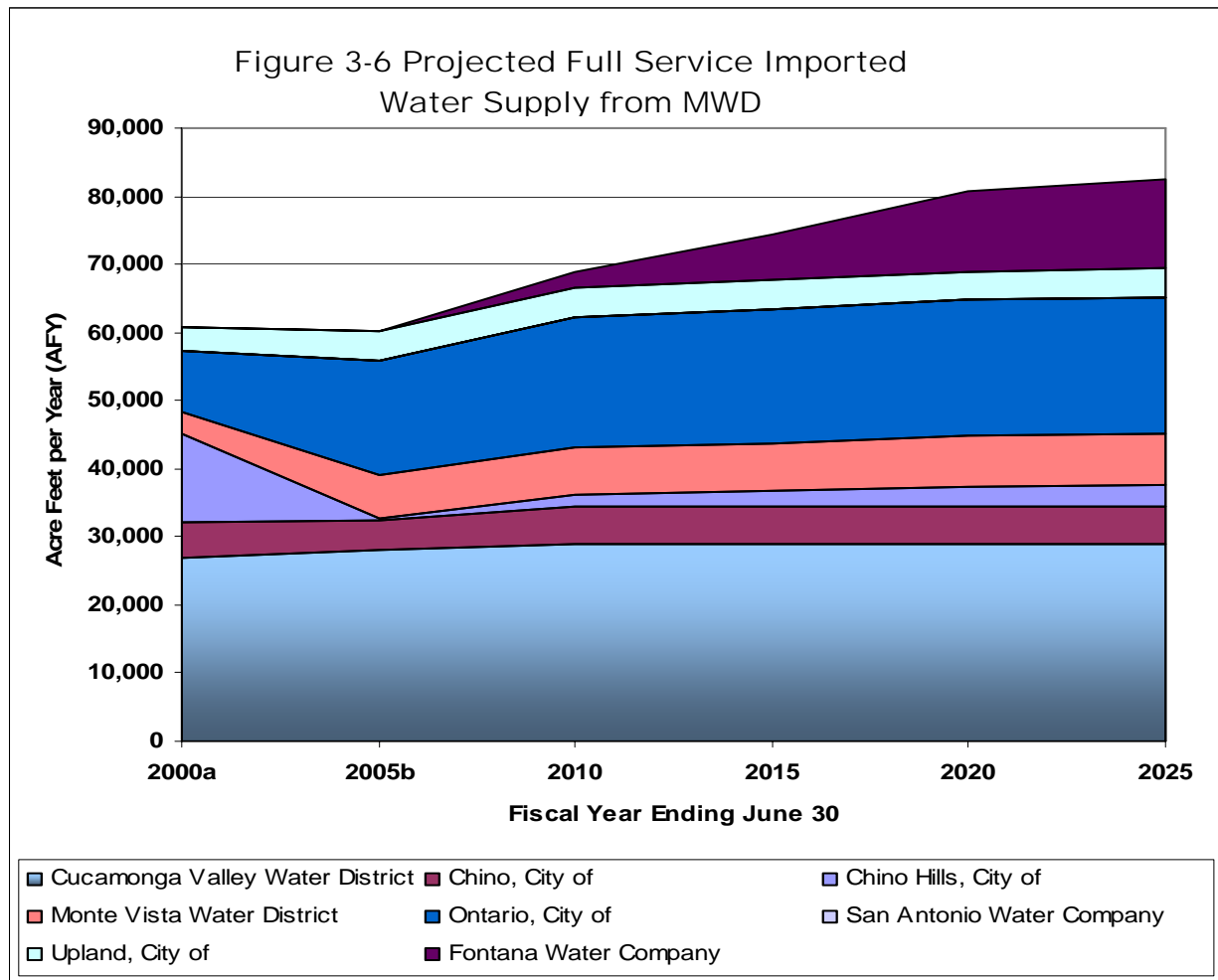
^b Estimated Values based on Wet Year

^c Rounded to nearest hundred

Significant investment in facilities is required in order to achieve the reduced dependence on imported water and to achieve the other program goals. These include capital expenditures of about \$110 million dollars for recycled water projects over the next 10 years, \$50 million dollars for construction of recharge basins, \$ 150 million for

⁴ Values in Tables 3-8 through 3-15 are estimates of available supplies from the eight member agencies in their respective UWMP. Therefore, values for 2005 will not necessarily match values for 2005 in Table 3-1 and Tables 3-4 through 3-6.

Desalters I and II, and \$ 27.5 million for the MWD recharge and extraction of stored imported water for the Dry Year Yield Program. Together, almost \$350 million is being spent to enhance local water supplies.



3.5 FUTURE LOCAL WATER SUPPLIES

In order to reduce the amount of full service imported water used in the future in this rapidly growing area, the use of future local water supplies will need to increase dramatically, particularly the use of groundwater, recycled water and recovered groundwater from the Chino Desalters. Surface water use will continue at existing levels.

Groundwater

Increased groundwater pumping from the Chino Groundwater Basin, particularly during dry years, is a critical element of the integrated water management strategy for meeting future water needs within IEUA's service area. The water extracted in excess of the annual safe yield, will be replenished from a mix of stormwater, recycled water and imported water during wet year periods.

Chino Basin groundwater supplies will be significantly enhanced over the next twenty years through the implementation of conjunctive management and groundwater quality improvement programs identified in the Optimum Basin Management Program (OBMP, see Chapter 6) and coordinated with the Chino Basin Watermaster. These include expansion of the Chino Basin Groundwater Recharge Program which will substantially increase the replenishment of the groundwater basin through a combination of storm water, recycled water and imported water (designed to maximize the use of interruptible supplies when available). Groundwater treatment facilities (well head ion exchange) are being constructed through the Dry Year Yield (Conjunctive Use) Program to facilitate recovery of the stored water during dry years. Over the next twenty years, there is the potential to increase the safe storage capacity of the Chino Groundwater Basin by 500,000 acre-feet.

As a result of these programs, groundwater supplies used to meet future water needs within IEUA's service area are expected to increase by about 70,000 acre-feet over the next twenty years (from about 94,600 acre-feet in 2005 to 165,000 acre feet in 2025 (Table 3-9).

Table 3-9
Projected Chino Basin Groundwater Production for Urban Use in IEUA Service Area (AFY)

Agency	Fiscal Year Ending June 30					
	2000 ^a	2005 ^b	2010	2015	2020	2025
Chino, City of	10,201	6,300	8,900	12,100	13,200	13,200
Chino Hills, City of	4,264	4,000	4,200	4,200	4,200	4,200
Cucamonga Valley Water District	7,250	13,800	28,000	34,000	37,000	37,000
Fontana Water Company	21,152	24,500	25,000	25,000	25,000	25,000
Monte Vista Water District	8,626	16,500	30,100	30,100	33,000	33,000
Ontario, City of	36,523	23,513	28,570	32,179	39,208	46,254
San Antonio Water Company	294	1,300	1,400	1,400	1,500	1,600
Upland, City of	1,570	4,700	4,700	4,700	4,700	4,700
Total ^c	89,900	94,600	130,900	143,700	157,800	165,000

^a Actual Values
Source: Retail Agency UWMPs

^b Estimated Values based on Wet Year

^c Rounded to nearest hundred

Chino Desalter Facilities

The area's ability to significantly increase future groundwater production from the Chino Groundwater Basin is directly linked to construction and operation of additional desalting capacity in the southern portion of the Basin. These desalter facilities will provide hydraulic control in the lower portion of the Chino Basin, ensuring that poor quality groundwater from this area does not migrate out of the Chino Basin and contaminate groundwater basins in Orange County. In addition, the desalters produce new reliable, high quality water supplies of 14,200 AFY (See Table 3-10) to meet the water demands within IEUA's service area as well as 10,400 AFY in the adjacent communities served by the City of Norco, Santa Ana River Water Company and the Jurupa Community Services District.

Table 3-10
Projected Chino Basin Desalter Water for Urban Supply (AFY)

Agency	Contracted Volume	Fiscal Year Ending June 30				
		2005 ^b	2010	2015	2020	2025
City of Chino	5,000	5,000	5,000	5,000	5,000	5,000
City of Chino Hills	4,200	1,250	4,200	4,200	4,200	4,200
City of Ontario	5,000	0	5,000	5,000	5,000	5,000
Subtotal for IEUA	14,200	6,250	14,200	14,200	14,200	14,200
Jurupa Community Services District	8,200	8,200	8,200	10,700	10,700	10,700
Santa Ana River Water Company	1,200	0	1,200	1,200	1,200	1,200
City of Norco	1,000	0	1,000	1,000	1,000	1,000
Subtotal for WMWD	10,400	8,200	10,400	12,900	12,900	12,900
Total ^c	24,600	14,500	24,600	27,100	27,100	27,100

^bChino Desalter 2 to begin operation at end of 2005

^cRounded to nearest hundred

Under the Optimum Basin Management Plan, approximately 40,000 acre-feet of desalter treatment capacity is proposed to be constructed. The desalters will use a combination of reverse osmosis and ion exchange technology to treat the pumped groundwater. The concentrated brine from the desalter operations will be delivered to the Santa Ana Regional Interceptor (SARI) brine line and conveyed to the Orange County Sanitation District for treatment and ultimate disposal in the Pacific Ocean.

The Desalter program is currently administered through the Chino Basin Desalter Authority (CDA), a joint powers authority among the Cities of Chino, Chino Hills and Ontario (within IEUA's service area) and the City of Norco, Santa Ana River Water Company and Jurupa Community Services District in the adjacent Western Municipal Water District.

Currently Desalter I is online, producing about 9,000 acre-feet per year of potable water. This project is being expanded and is expected to produce between 14,000 and 15,900 acre-feet per year of potable supplies. In addition, a second facility, Desalter II, is under construction, and is expected to produce an additional 10,000 acre-feet of new water supplies by the end of 2005. A third Desalter with 16,000 acre-feet of treatment capacity is being discussed and represents a potential alternative supply in ten to fifteen years (see Chapter 7).

As a result of these programs, the portion of the desalter water supplies used to meet future water needs within IEUA's service area are projected to increase from 6,250 AFY during 2005 to 27,100 AFY in the near future.

Other Groundwater

No significant changes are forecasted for the average amount of water supply production from other groundwater basins that are used to meet demands within IEUA's service area. On average, about 33,000 acre-feet per year is projected to be pumped from these outside basins between 2005 and 2025. This is a conservative estimate, consistent with historic production levels. Table 3-11 presents this projected use of other groundwater by agency.

Table 3-11
Projected Other Basin Groundwater Supply in IEUA Service Area (AFY)

Agency	Fiscal Year Ending June 30					
	2000 ^a	2005 ^b	2010	2015	2020	2025
Chino, City of	0	0	0	0	0	0
Chino Hills, City of	0	0	0	0	0	0
Cucamonga Valley Water District	12,800	5,400	5,400	5,400	5,400	5,400
Fontana Water Company	18,985	17,900	17,900	17,900	17,900	17,900
Monte Vista Water District	0	0	0	0	0	0
Ontario, City of	0	0	0	0	0	0
San Antonio Water Company	9,428	6,400	6,400	6,500	6,500	6,500
Upland, City of	17,406	3,100	3,100	3,800	3,900	3,900
Total ^c	58,600	32,800	32,800	33,600	33,700	33,700

^a Actual Values

^b Estimated Values based on Wet Year

^c Rounded to nearest hundred

Surface Water

No significant changes are forecasted on the average amount of water production from surface supplies that are used to meet demands within IEUA's service area. The availability of surface water supplies fluctuates greatly with wet and dry years. Retail agencies with access to surface supplies are investing in infrastructure that will improve their ability to capture and use these water sources.

On average, about 18,700 acre-feet annually of surface water is projected to be available between 2005 and 2025 as shown on Table 3-12. This is a conservative estimate, consistent with historic production levels.

Table 3-12
Projected Surface Water Production Supply in IEUA Service Area (AFY)

Agency	Fiscal Year Ending June 30					
	2000 ^a	2005 ^b	2010	2015	2020	2025
Chino, City of	0	0	0	0	0	0
Chino Hills, City of	0	0	0	0	0	0
Cucamonga Valley Water District	4,862	3,000	3,000	3,000	3,000	3,000
Fontana Water Company	4,180	7,000	7,000	7,000	7,000	7,000
Monte Vista Water District	0	0	0	0	0	0
Ontario, City of	0	0	0	0	0	0
San Antonio Water Company	536	3,500	3,500	3,500	3,500	3,500
Upland, City of	346	5,200	5,200	5,200	5,200	5,200
Total ^c	9,900	18,700	18,700	18,700	18,700	18,700

^a Actual Values

^b Estimated Values based on Wet Year

^c Rounded to nearest hundred

Recycled Water

The implementation of the planned Regional Recycled Water Program is the second critical element of the integrated water management strategy for meeting future water needs within IEUA's service area.

Water supplied through the IEUA's Regional Recycled Water Program will serve the area's needs for irrigation and industrial process water (direct use) as well as provide

replenishment water for the Chino Groundwater Basin in conjunction with local storm water and imported deliveries. Over 2,000 potential direct use customers have been identified and a distribution pipeline system and related facilities have been designed and are under construction to hook up these customers over the next ten years. In addition, the pipelines will deliver recycled water to more than twenty groundwater recharge basins within IEUA's service area (also see Chapter 5).

The regional distribution facilities will include over fifty separate pipelines, pump stations, and reservoir projects. The phased construction of these facilities is projected to cost \$200 million and is scheduled to be well underway by 2015. The Regional Recycled Water Program is planned to deliver a total of 74,000 acre-feet of new water supplies for both direct and replenishment within ten years. An aggressive marketing program is underway to make the recycled water available to the customers.

Beyond 2015, an additional 50,000 acre-feet annually of high quality recycled water will be available through IEUA's treatment plants as a result of expected population growth within its service area. This represents a new potential alternative water supply that will be available within 15-20 years and beyond (see Chapter 7).

The amount of recycled water that is projected to meet future water needs within IEUA's service area is based upon the completion of the currently planned facilities. Of the 74,000 acre-feet that will be distributed by 2015, 49,000 acre-feet annually will be for direct use (irrigation, industrial processing) and 25,000 acre-feet annually will be for groundwater replenishment. The projected recycled water supply by agency is shown in Table 3-13 along with the total available recycled water.

Table 3-13
Projected Recycled Water Production in IEUA Service Area (AFY)

Agency	Fiscal Year Ending June 30					
	2000 ^a	2005 ^b	2010	2015	2020	2025
Chino, City of	368	3,400	4,600	6,300	8,900	8,900
Chino Hills, City of	129	800	2,900	4,000	4,000	4,000
Cucamonga Valley Water District	0	1,270	10,250	15,900	19,200	21,600
Fontana Water Company	0	0	2,600	3,400	4,000	4,300
Monte Vista Water District	0	0	400	500	700	700
Ontario, City of	1,073	1,800	7,900	8,800	11,800	12,400
San Antonio Water Company	0	0	0	0	0	0
Upland, City of	0	0	0	0	0	0
Subtotal	1,570	7,270	28,650	38,900	48,600	51,900
IEUA	3,090	130	5,175	5,050	4,700	8,550
Total Recycled Water Direct Use	4,700	7,400	33,800	44,000	53,300	60,500
Future Recycled Water Supply^d						
Direct Use	4,700	7,400	39,000	49,000	58,000	69,000
Groundwater Replenishment (IEUA)		1,000	22,000	25,000	28,000	35,000
Total Recycled Water Use^c	4,700	8,400	61,000	74,000	86,000	104,000

^a Actual Values

^b Estimated Values based on Wet Year

^c Rounded to nearest hundred

^d Based on IEUA Recycled Water Implementation Plan

Source: Retail Agency's UWMPs

3.6 FUTURE IMPORTED WATER SUPPLIES

Increasing conflicts over the quantity and quality of the imported water from the State Water Project (SWP) and Colorado River Aqueduct (CRA) have increased the costs of these supplemental supplies in Southern California as well reduced their potential reliability.

MWD evaluated the dependability of these supplies in and concluded that imported water would be available to ensure the continued delivery of the historic average imported water amounts of 1.2 million acre feet annually (CRA) and 700,000 acre-feet annually (SWP)⁵. IEUA expressly relies upon MWD's Draft UWMP in estimating future imported water availability to its service area (see Chapter 10).

In April of 1998, Metropolitan's Board of Directors adopted the Water Surplus and Drought Management Plan. The guiding principle of the WSDM Plan is to manage Metropolitan's water resources and management programs to maximize management to wet year supplies and minimize adverse impacts of water shortages to retail customers. From this guiding principle come the following supporting principles:

- Encourage efficient water use and economical local resource programs
- Coordinate operations with member agencies to make as much surplus water as possible available for use in dry years
- Pursue innovative transfer and banking programs to secure more imported water for use in dry years.
- Increase public awareness about water supply issues.

As a result of the integrated water management strategy being implemented within IEUA's service area, the amount of firm full service imported water needed to meet the area's expected water demands over the next twenty years is expected to increase from 60,200 to about 82,500 AFY as presented in Table 3-14. Even with the expected growth in the area's average annual water supply (163,000 acre feet without conservation over the next twenty years), these new water supplies are planned to be met primarily through locally developed water supplies. Full service imported water purchases are expected to remain within MWD's lower cost Tier I fee schedule for most current users of these supplies.

⁵ MWD Draft Urban Water Management Plan, September 2005

Table 3-14
Projected Imported Water Supply in IEUA Service Area (AFY)

Agency	Fiscal Year Ending June 30					
	2000 ^a	2005 ^b	2010	2015	2020	2025
Chino, City of	5,195	4,300	5,400	5,400	5,400	5,400
Chino Hills, City of	12,940	400	1,900	2,400	2,800	3,300
Cucamonga Valley Water District	26,920	28,000	29,000	29,000	29,000	29,000
Fontana Water Company	0	0	2,300	6,500	11,600	13,000
Monte Vista Water District	3,298	6,300	6,800	6,800	7,600	7,500
Ontario, City of	8,824	16,900	19,100	19,900	19,900	20,000
San Antonio Water Company	0	0	0	0	0	0
Upland, City of	3,717	4,300	4,300	4,300	4,300	4,300
Total ^c	60,900	60,200	68,800	74,300	80,600	82,500

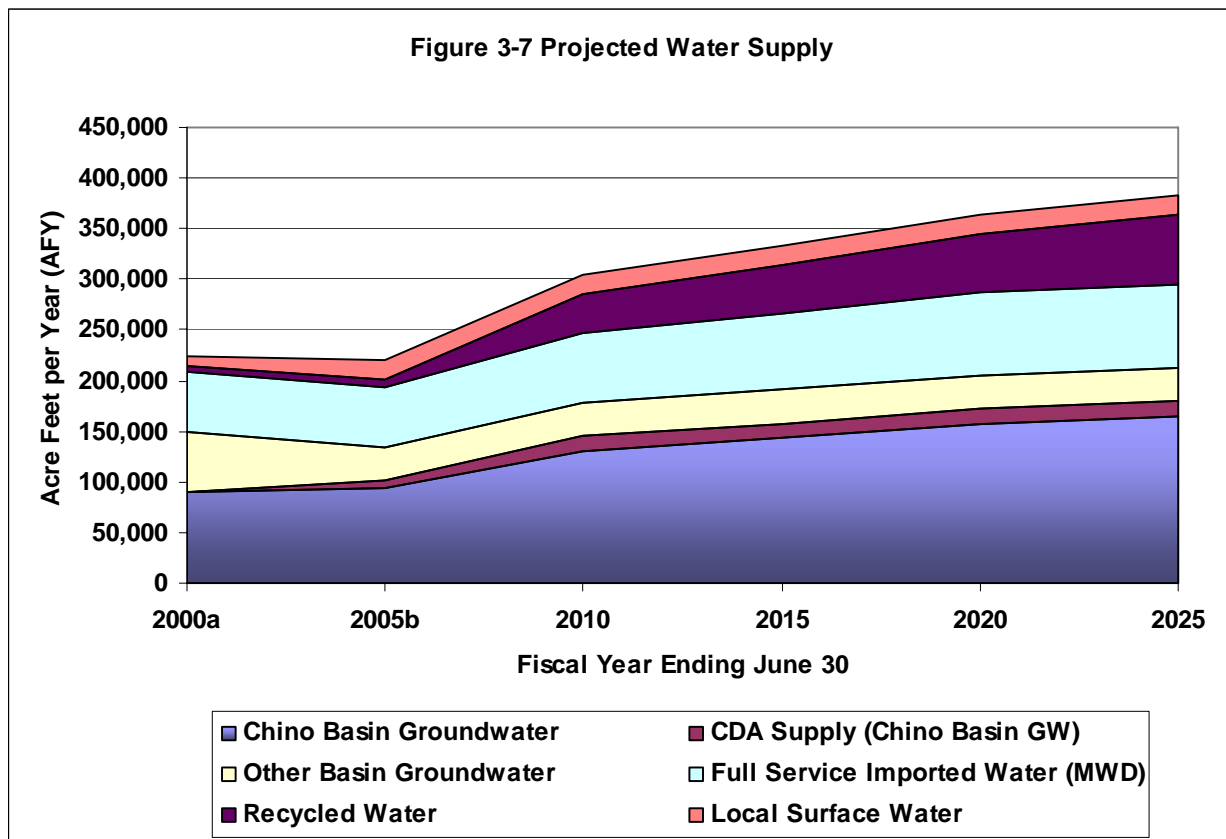
^a Actual Values

^b Estimated Values based on Wet Year

^c Rounded to nearest hundred

3.7 FUTURE WATER SUPPLIES SUMMARY

Through the implementation of the integrated water management strategy within IEUA's service area, available water supplies will exceed anticipated demand. Projected water supply mix needed to meet urban water use by source within the IEUA service area is shown in Figure 3-7. The projected water use by agency is presented in Table 3-15.



**Table 3-15
Projected Urban Water Supply by Agency (AFY)**

Agency	Fiscal Year Ending June 30					
	2000^a	2005^b	2010	2015	2020	2025
Chino, City of	15,764	19,000	23,900	28,800	32,500	32,500
Chino Hills, City of	17,333	16,750	22,700	24,700	25,400	26,400
Cucamonga Valley Water District	51,831	51,500	75,650	87,300	93,600	96,000
Fontana Water Company	44,317	49,400	54,800	59,800	65,500	67,200
Monte Vista Water District	11,924	12,500	27,800	27,500	31,100	30,500
Ontario, City of	46,420	43,000	61,300	66,600	76,700	84,400
San Antonio Water Company	10,257	4,135	4,235	4,335	4,435	4,535
Upland, City of	23,038	23,600	23,600	24,300	24,400	24,400
Excess Recycled Water Supply	3,090	260	10,350	10,100	9,400	17,100
Total	224,000	220,100	304,300	333,400	363,000	383,000

^a Actual Values

^b Estimated Values based on Wet Year

^c Rounded to nearest hundred

CHAPTER 4

WATER CONSERVATION PROGRAM

4.1 OVERVIEW

Conservation in the IEUA service area is an important component of water resource management. Over the last five years, IEUA has implemented a variety of conservation programs and public educational approaches to encourage greater participation and awareness of the need for conservation with retail water agencies to meet their water management goals. With rapid urban growth in the IEUA service area, encouraging “smart” water efficient practices in new development is very cost effective. Conservation programs are also cost-effective because when viewed as a water supply option, it is one of the least expensive sources of new water.

4.2 COMMITMENT TO CONSERVATION

The IEUA is a signatory to the Memorandum of Understanding (MOU) regarding Urban Water Conservation in California and is a member of the California Urban Water Conservation Council (CUWCC). IEUA has made the 14 Best Management Practices (BMP's) the cornerstone of its conservation programs and a key element in the overall regional water resource management strategy for the region.

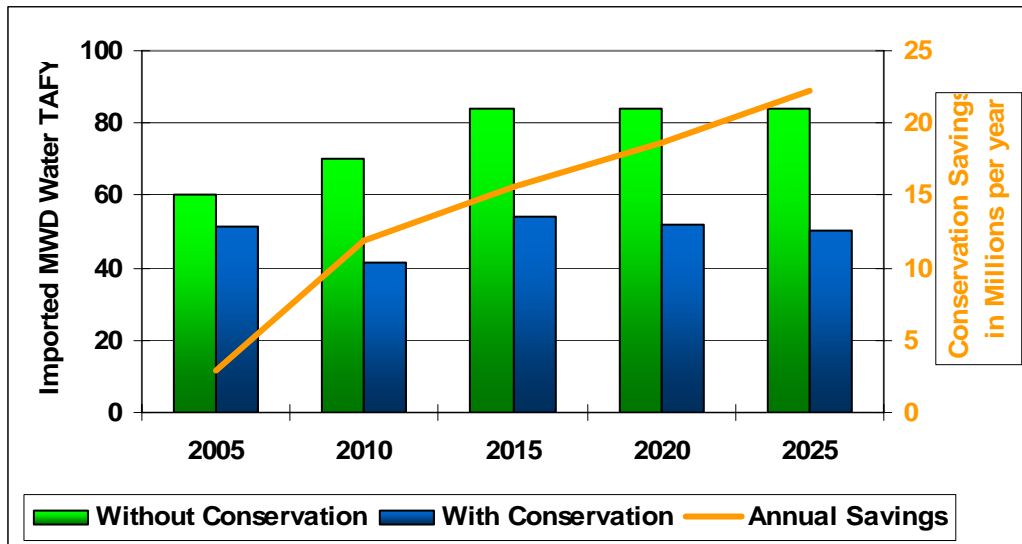
Members of the CUWCC are required to provide BMP “Activity Reports” every two years. These reports provide specific details of the agency’s efforts to implement each particular BMP. The BMPs are functionally equivalent to the Demand Management Measures (DMM) written in Water Code Section 10631 of the Urban Water Management Planning Act (Act). The Act requires an agency to describe each of the DMMs that have been implemented unless the agency is a signatory to the MOU. The Act allows an agency to provide the BMP Activity Report in-lieu of describing each of the DMMs. Therefore, IEUA has included its FY 2001-02 and 2003-04 BMP Activity Reports in Appendix B.

4.3 VALUE OF CONSERVATION

Over the last five years, IEUA and the regional retail water agencies have developed a strong partnership and a coordinated approach to conservation management measures that reduce water use. Conservation has multiple benefits, one of which is the value of conservation to the region’s ratepayers. Conservation saves money to the ratepayer.

Figure 4-1 quantifies the value of conservation to the region by comparing projected imported water purchases versus projected water conservation savings. Using conservation savings estimates for the next twenty years, the region can save an estimated \$300 million by reducing the amount of imported water purchased.

Figure 4-1
Avoided Tier II Costs Due to Conservation (Dry Year)



Source: Conservation projections from Table 2-4 & MWD's Long Range Finance Plan and MWD staff projections

IEUA provides water use demands without conservation estimates, by single-family, multi-family, commercial/industrial, and non-metered uses in Appendix V.

Overall, there are multiple benefits of conservation:

- Ratepayers save money on their water utility bills;
- Reduced wastewater flow at IEUA water recycled plants;
- Reduced urban runoff from improved irrigation efficiency;
- Avoidance of purchasing expensive imported water; and
- Environmental benefits (CALFED).

Another regional benefit for maintaining a strong support for conservation is the reduced dependence on imported water from the California Bay-Delta (Bay-Delta). The Bay-Delta is the single most important link in California's water supply system. Two major water supply projects, the State Water Project (SWP) and the Central Valley Project convey Bay-Delta water to more than 22 million Californians and 7 million acres of farmland. The IEUA service area receives a significant portion of its supply (about 30 percent) from the SWP via Metropolitan

Water District. Local water supply projects such as conservation help limit the amount of water taken out of the Bay-Delta for water supply, thus enhancing Bay-Delta water supply, water quality and environmental protection. Conservation also helps increase irrigation efficiency which reduces runoff and the associated damage to the asphalt of roads and parking lots that can be very expensive to repair.



Example of asphalt damage due to improperly operating irrigation system

Finally, conservation also benefits the region through energy savings. Whenever water moves from one point to another, energy is involved. Electricity to pump water is the single greatest use of power in the state amounting to about 19 percent of all power used in California. When water deliveries are reduced, significant energy is saved.

4.4 CONSERVATION OPPORTUNITIES

The Inland Empire is one of the fastest growth areas in the nation. In 2004, over 5,300 new single-family homes were constructed in the IEUA service area. This averages out to about 440 new homes per month.



In the IEUA Service Area, over 5,300 new homes were built in 2004

Inland Empire also means a generally warmer climate. As discussed in Chapter 1, the IEUA service area has an average annual temperature of about 80 degrees. Higher temperatures (as compared to a coastal environment) mean increased demand for water to stay cool. This includes swimming pools, water parks, cooling towers, etc. Warmer

temperatures also mean increased demand for landscape irrigation. Landscaping is one of the most important elements to making any building more attractive. There is a substantial dollar amount tied to maintaining the existing landscaping, therefore, property owners will have no issues about increasing

watering frequency, particularly during the hot summer months, to make sure their landscaping is well watered.

Core Strategies for Our Region

2005-2010 Water Conservation Strategy

There are five key elements to the 2005-2010 water conservation strategy within the Chino Basin:

- **Integrate conservation with other water management programs to maximize the overall water supply, water quality, flood control and environmental benefits to the region.**

Water conservation and IEUA's efforts to promote the use of recycled water should be an integrated message to all customers. Converting any existing use from drinking water to recycled water achieves the highest potential water conservation savings. In addition, conserving storm water at all properties reduces downstream flood problems and potential water quality issues but also may increase the percolation and recharge of Chino Groundwater Basin and thereby enhance the safe yield of the Basin. The conservation programs implemented in the next five years should feature multiple benefits and explicitly call out these benefits as part of the education message.

- **Encourage all new development to be more water and energy efficient.**

It is far more cost-effective to build efficiency into new development than to retrofit after construction. It is impressive how much even a modest reduction in per capita water demand of each new building can translate into significant avoided demand for costly imported water supplies. Since the majority of the region's new water demand will come from residential growth, making new development as water (and energy) efficient as possible is a key strategy for the future.

- **Promotion of California Friendly Landscapes in existing development.**

Agencies have begun to realize that the next significant amount of conserved water will be from improvements to existing irrigation systems and improved landscaping techniques. Regionally, Metropolitan Water District has introduced this concept as "California Friendly." Over the next five years, the region should pursue this and other related landscape efficiency concepts such as weather-based irrigation controller rebates, irrigation system survey and audits, homeowner landscape classes, recycled water (where feasible), healthy soils approach that includes compost use and turf reduction.

- **Continue residential appliance retrofit programs that target the most wasteful water using appliances and applications.**

Water wasting appliances and applications will be slowly phased out as old equipment is replaced with newer, more efficient models. The region can significantly increase the rate at which inefficient equipment and landscaping is replaced and by offering incentives for property and business owners, capturing the value of these savings sooner. Over the next five years, the region should prioritize and implement program that expedite replacement of the largest sources of wasted water within the Chino Basin.

- **Expand public education program and place an emphasis on development of partnerships with school districts to promote wise water use and how this contributes to the quality of life/economic sustainability of the region.**

Conservation is only effective when it is practiced. Changes in infrastructure and appliances help to prevent waste, but ultimately it is the water user's choice as to how much water is conserved. The regional education programs need to be designed to reach multiple constituencies, with a high priority placed on school programs for two reasons: 1) Young people are most effective at teaching their parents what needs to be done, and 2) these are the people who will be most impacted in the future by how well we manage our water resources today. Overall, the conservation message over the next five years should emphasize the creation of the public's role as partners with their local government in securing reliable, cost effective water supplies for the region.

Regional Conservation Potential

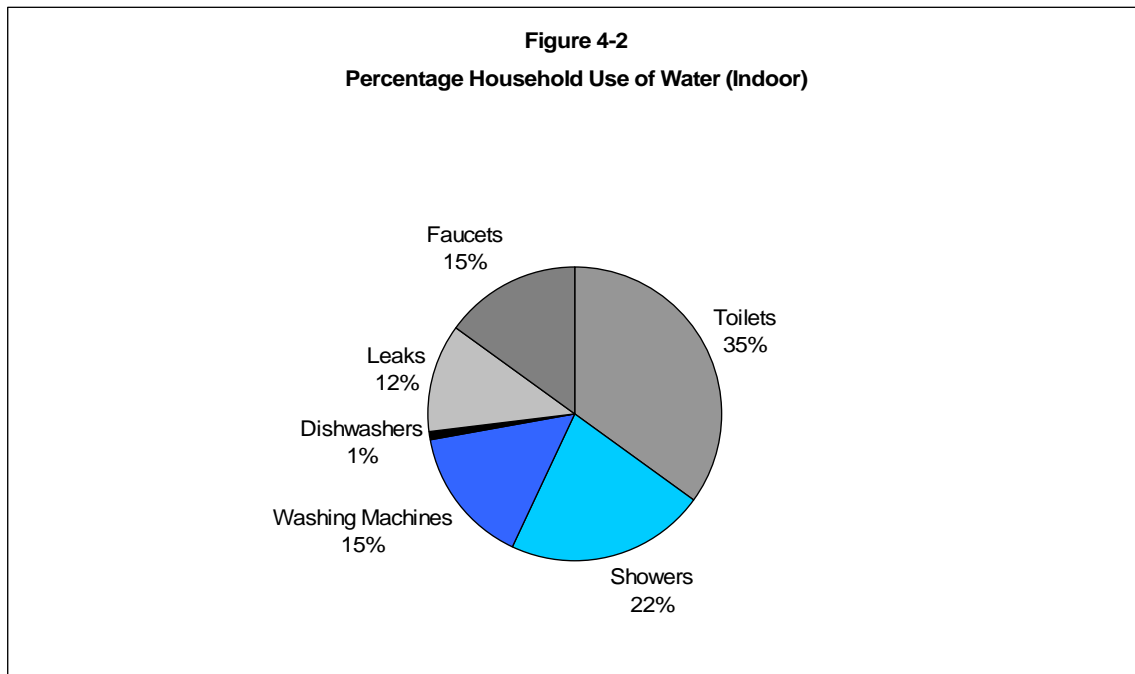
In November 2003, the Pacific Institute for Studies in Development, Environment and Security released a report entitled "Waste Not, Want Not: The Potential for Urban Water Conservation in California." The report was developed to show, for the first time, what the potential for water conservation could achieve. The Pacific Institute determined that current water use in the urban sector of California equaled amount 7 million acre feet each year. The maximum amount of water savings that could be achieved through the statewide implementation of indoor, outdoor, and CII programs using current technologies could equal between 2.0 and 2.3 million acre feet (AF).

IEUA staff followed this same methodology to estimating potential water conservation by adapting the analytical approach presented in the report to the IEUA service area. Staff did not attempt to break down the water savings potential by retail agency. Instead, the conclusion addresses the entire service area to provide an estimate of the potential water savings for the next five years.

Indoor Water Use

Figure 4-2 presents a look at where water is used throughout the household. These are the areas of significant household water use that were reviewed in the

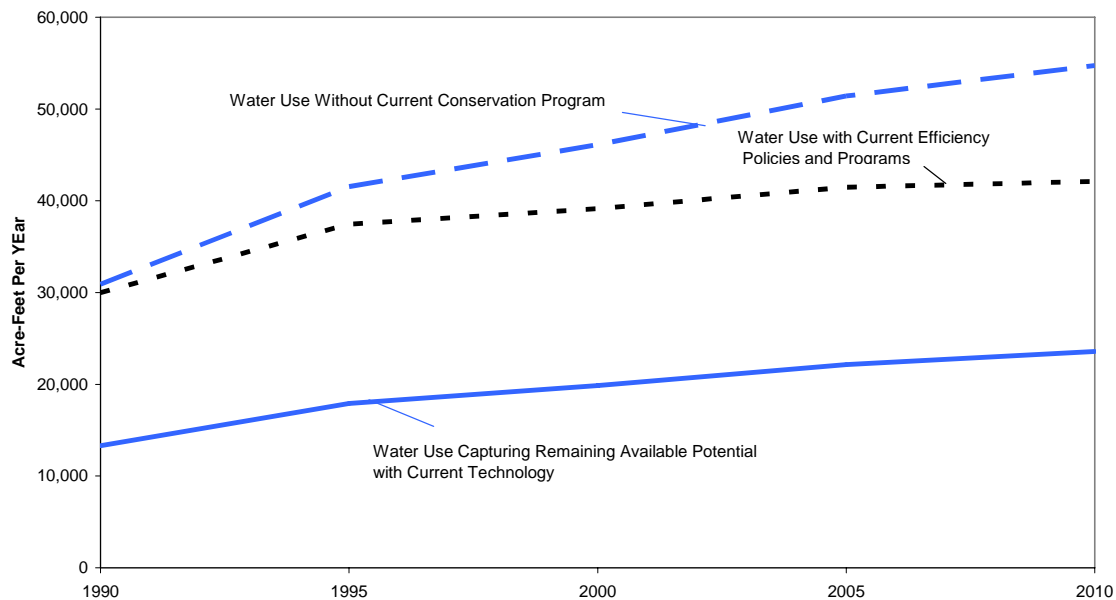
study and do not vary much throughout the state. As presented, toilets are the single most intensive use of water in the household followed by showers, washing machines and faucets. While not a household “use” of water, leaks still represent a significant portion of the overall indoor water use picture.



Source: All percentages of water use are from the Pacific Institute Report “Waste Not, Want Not”

Figure 4-3 shows that without any water conservation programs or policies, local or statewide, our service area would continue to see a growth in indoor water use to about 52,000 AF by 2010. The dotted line in Figure 4-3 shows that with current local and statewide policies, and the current conservation programs already in place in the IEUA service area, water use in the indoor sector is about 41,500 AF each year. If IEUA and the regional agencies were to adopt programs and policies, using current technologies, beyond what is currently being done, there is an additional 19,000 AF of water savings that could be captured.

Figure 4-3
IEUA Service Area Indoor Water Use 1990-2010 and the
Effect of Conservation Programs

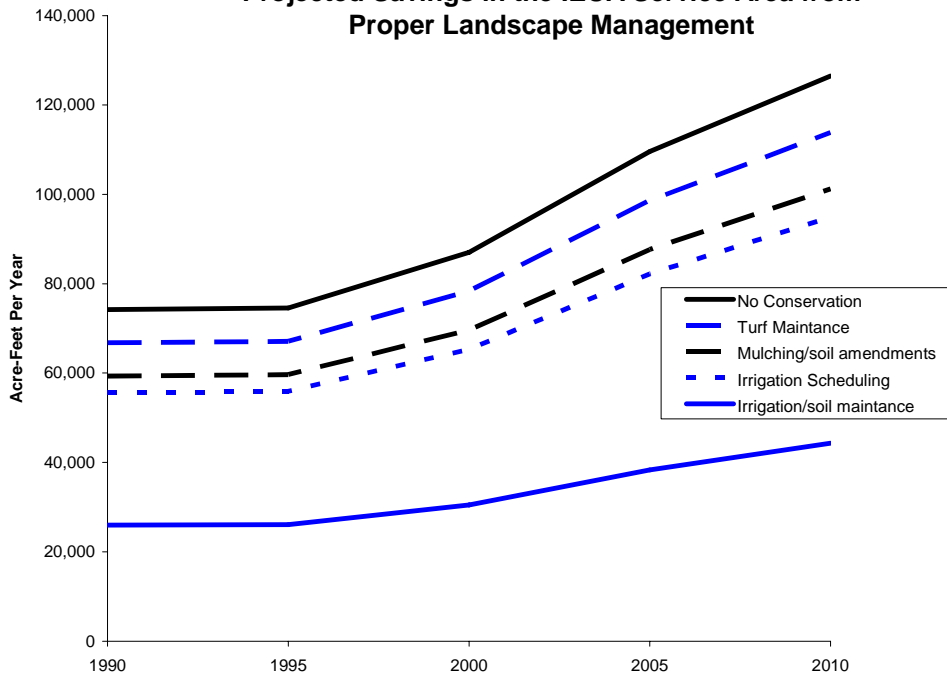


Outdoor Water Use

It is difficult to look at water conservation in the outdoor environment in the same manner as indoor water savings. The main reason is that there are many policies and design standards for indoor appliances and fixtures that do not exist for outdoor appliances and fixtures. Since the outdoor environment (referred to landscaping and irrigation) has not had the kind of water conservation attention that indoor appliances have had over the years, there really is no base year to start from. This assessment is based on current water use and provides examples of programs and procedures in a “what if?” scenario.

Figure 4-4 shows the projected water savings that could be achieved if the entire region had been involved in proper landscape management since 1990. The top line shows how much water is currently being used to irrigate our landscaped areas and what we can expect to use if no new outdoor conservation policies or programs are introduced over the next five years.

Figure 4-4
Projected Savings in the IEUA Service Area from
Proper Landscape Management



Source: Waste Not, Want Not: The Potential for Urban Water Conservation in California, The Pacific Institute, Nov. 2003

Although methods of proper landscape management show some promise in terms of water savings, by far the most significant presented is irrigation and soil maintenance. This involves checking for leaks, fixing broken heads, and fertilizing on a regular basis, something that most gardeners should be doing now, but probably are not. If all landscape maintenance personnel adopted this approach to maintenance, the potential savings could be as much as 80,000 AF each year.

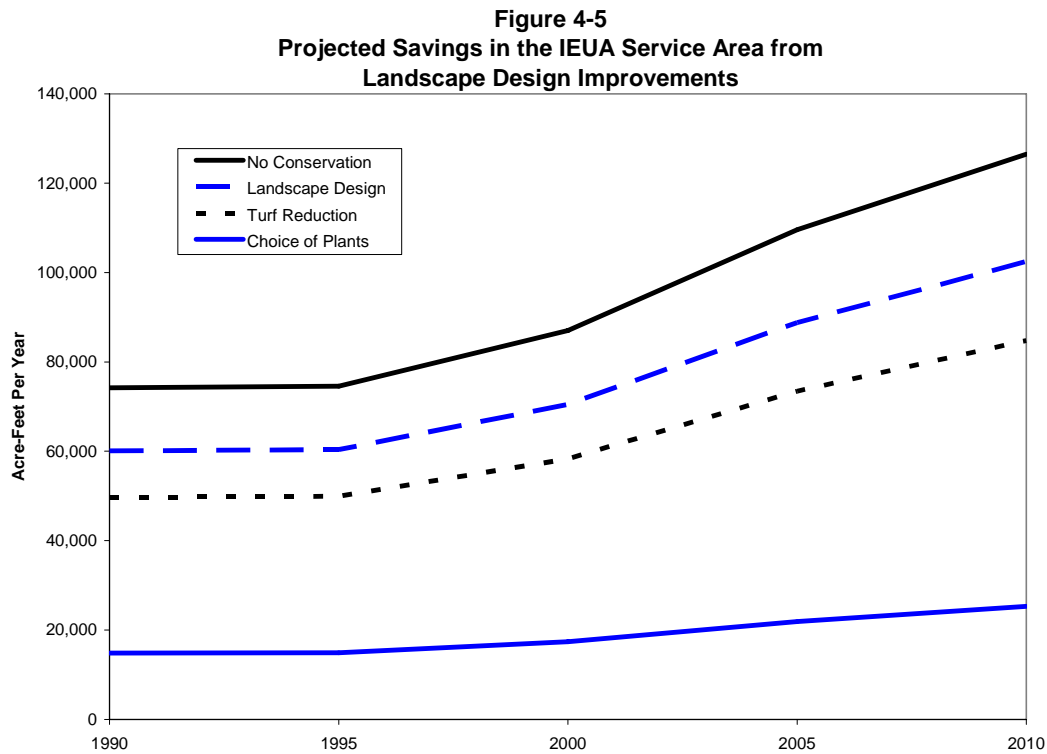
The total effect of water conservation programs represent significant savings if all policies and programs were in effect and were maximized to their potential. Unfortunately, to achieve these kinds of results across the entire menu of programs that could be implemented is unrealistic due to the limited financial resources available. The greater likelihood is that IEUA and the retail water agencies, after careful review and focusing attention on areas with highest cost-effectiveness, could capture a significant portion of these potential savings.

Core Conservation Goal

Based upon the analysis of the potential water conservation savings that could be achieved in both the indoor and the outdoor environments, IEUA strongly recommends an annual conservation goal of 10% of the total water used within the IEUA service area. In Fiscal Year 2010, the IEUA service area is estimated to use 263,000 acre-feet. This will set the conservation goal for 2010 at

approximately 26,000 acre-feet. Based on the analysis of potential water savings, a 10 percent goal is achievable within a five year period.

Figure 4-5 shows what could be achieved outdoors if IEUA and the regional agencies could encourage design improvements to all new and existing landscaping. Approximately 109,000 AF per year is being used to irrigate IEUA service area landscapes. In 2010, this number is expected to increase to over 126,000 AF. This is a 17,000 AF increase in just over 5 years.



Definitions:

Landscape Design – Involves controlling the area and perimeter of turf, minimizing narrow paths or steep areas than cannot be irrigated efficiently and grouping plants with similar irrigation needs.

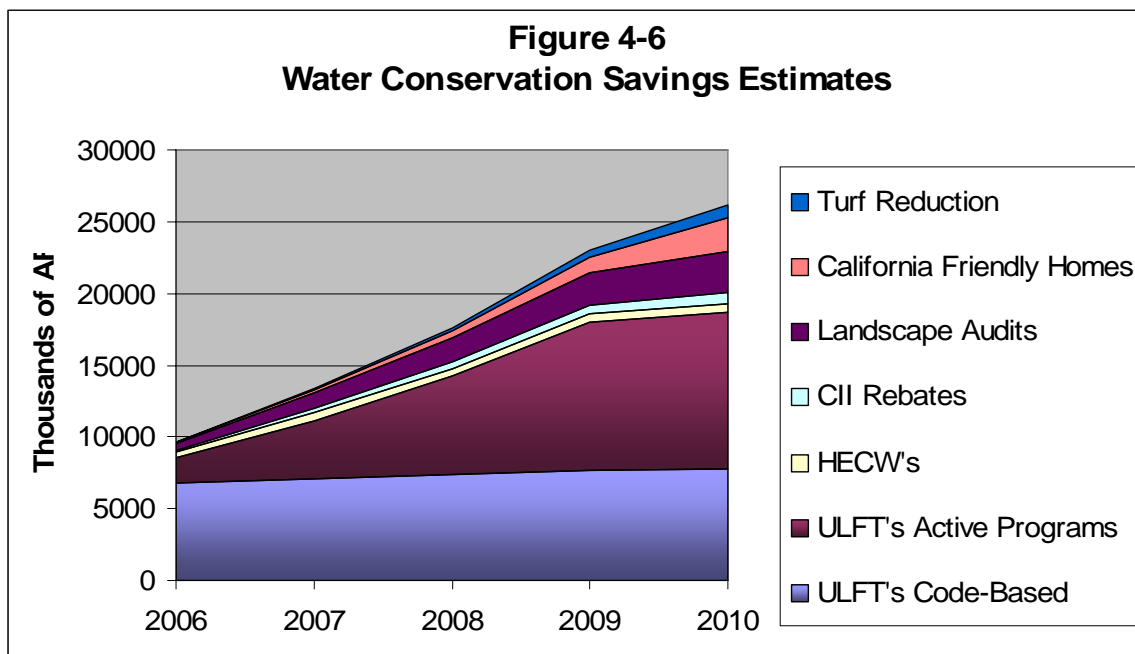
Turf Reduction – Non-turf areas are not necessarily comprised of low water using plants. Non-turf areas can include porous surfaces.

Choice of Plants – Savings based on ETo range of 0.2 to 1.0 and a current ETo of 1.0.

The top line in Figure 4-5 represents current water use and expectations for water demand through 2010. If proper landscape designs were instituted in existing landscapes in 1990, by 2005 the IEUA service could have water savings of about 24,000 AF per year. As growth occurs in the service area in new construction over the next twenty years, total water use in this area could increase significantly unless new design standards are in place. Although turf reduction could show even more savings, the choice of plants clearly shows the most significant savings. If all landscapes were using drought-tolerant or “California Friendly” type plants since 1990 and watering accordingly, by 2005 irrigation demand use could have been reduced by about 25,000 AF each year.

Clearly, if new homes are constructed to be more water efficient, a retrofit program becomes a mute point because water savings are captured before the first owner takes possession of the property. New home production is expected to increase by about 30,000 between 2005 and 2010. If all these new homes are constructed to “California Friendly” standards, the savings would be significant, about 4,800 AF.

To meet the goal, IEUA and the Regional Conservation Partnership will develop existing and new programs to reduce residential and commercial demand over the next five year period. Figure 4-6 provides series of programs that build upon one another year after year to reach well over 22,000 acre-feet of annual water savings. IEUA will continue with its current slate of indoor appliance incentive programs and aggressively pursue landscape programs such as residential and commercial landscape audits, develop a turf reduction incentive program, and promote new home water efficiency through MWD’s “California Friendly” programs.



To reach the goal of 22,000 acre-feet of water savings, IEUA will need to generate about \$1 million in local funding to support these regional programs.

Funding Goal

Currently, the IEUA regional conservation budget is about \$600,000. These revenues are collected with the support and cooperation of the local retail water agencies. The sources of revenues for the regional conservation budget:

- Imported Water Surcharge (Currently \$4/AF)

- Property Tax Revenue (Currently \$75,000)
- Retail Meter Revenues (Currently \$55,000)
- Regional Sewerage Revenues (Currently \$50,000)

These local funds are cost-shared with funding from our partner agencies such as the Metropolitan Water District of Southern California, the California Department of Water Resources, and the U.S. Bureau of Reclamation to develop a budget of well over \$1 million. Approximately \$2 of outside funding are developed for each \$1 of IEUA regional revenues.

In order to develop the regional conservation programs over the next five years as described above, IEUA proposes to more than double the budget of local funding to about \$1 million. Table 4-1 describes the local funding needs of the existing and proposed programs to meet the conservation goal. Note that the MF Direct Install program will be installing a total of 22,500 toilets over a three-year period and will have to be funding accordingly.

**Table 4-1
Minimum Annual Local Funding Needs**

Future Program	Annual Units	Estimated Local Funding Needed
Residential ULFT	5,000	\$30,000
MF Direct Install	5,000	\$200,000
CII Rebate Programs	Variable	\$100,000
Residential Landscape Audits	100	\$30,000
Commercial Landscape Audits	200	\$100,000
Turf Buy Back	Variable	\$50,000
CA Friendly Homes	500	\$350,000
Total		\$860,000

To reach \$1 million, IEUA proposes to increase the local funding to conservation through an increased share of property taxes that are already collected by IEUA. In addition, IEUA proposes to increase the amount of funds transferred to conservation from the Regional Sewerage Fund. Finally, IEUA proposes to increase the imported water surcharge to \$5 per acre-foot within the next year, then up to an additional \$3 per acre-foot over the next five years. When leveraged with funding from our partner agencies, IEUA should be able to create a regional budget of \$2 to \$2.5 million annually.

4.5 CONSERVATION PROGRAMS TO DATE

Over the last five years, IEUA and the regional retail water agencies have dramatically developed the conservation programs from a minimal ultra-low flush (ULF) toilet distribution program to a series of diverse residential, commercial, industrial, institutional (CII), and school education incentive programs. As

mentioned earlier, the cornerstone of IEUA's efforts over the last five years has been the development of programs that meet the requirements of the Memorandum of Understanding (MOU) regarding Urban Water Conservation Best Management Practices (BMP).

Implementing the BMPs

As one of the original signatories to the MOU in 1991, IEUA's highest conservation priority is seeing that good-faith efforts are being made to implement the BMP's locally. To accomplish this, IEUA formed the Water Conservation Partnership Workgroup. The Workgroup, made of representatives from each of the 8 local retail water agencies, is an advisory body that meets monthly to discuss the implementation of regional conservation programs, most of which are BMP related. The Workgroup ensures communication and coordination between the agencies to effectively implement the water conservation program.

2000-2005 Conservation Initiatives

In IEUA's 2000 Regional Urban Water Management Plan (UWMP), water conservation emerged as a significant water management tool in the IEUA service area. It was determined that the best way to meet the five-year conservation goal of 5,000 acre-feet was to "ramp-up" over several years. This would allow IEUA to expand the conservation programs without high up-front costs and achieve the long term desired water savings.

During this five year period, IEUA introduced a variety of new and innovative incentive programs to help achieve the conservation goal. The programs discussed below are summarized by retail water agency on page 4-18. These programs will reduce IEUA's demand on imported water sources, and will provide a drought-proof resource that is not subject to environmental restrictions and weather conditions.

The water conservation program has been divided into five categories; agency support, residential, commercial/industrial/institutional, landscape, and school education.

Agency Support

In 2003-04, IEUA began a program to provide financial assistance to each of the local retail agencies in an effort to support local BMP implementation. Specifically, IEUA provides an annual grant of \$2,000 to each agency for a BMP related program or project. This is part of IEUA's commitment to BMP #10 (Wholesaler Assistance Programs) where the wholesaler is required to provide financial and/or technical assistance to their local agencies to implement BMP's.

In 2004-05, three retail agencies used their grant monies to help fund the creation of a Groundwater Model to demonstrate the movement of water in the Chino Groundwater Basin. Other agencies have use the funding for a variety of other projects such as a Kid's Environmental Educational Day Festival, purchase of handout materials for the Chino Youth Museum, and expansion of school education programs.

Over the last two years IEUA has provided more than \$18,000 to local agencies for BMP related programs.

Residential

Active ULF Toilet Programs

The ULF Toilet Programs began in 1991 with a single residential toilet exchange event, and has blossomed over the past fourteen years. Particularly over the last 5 years with the introduction of a ULF toilet residential rebate program, a multi-family toilet exchange program, and a pilot multifamily direct-install program. Water savings associated with the more than 35,000 ULF toilets installed to date is equal to an estimated 1,800 acre-feet annually, and \$750,000 in avoided Tier II water purchases. These multi-beneficial toilet replacement programs help the retail water agencies meet their obligations under BMP #14.

Code Based ULF Toilet Programs

In addition to the active programs, IEUA can estimate the number of toilets that are replaced with ULF models without using the incentive based programs offered by IEUA and the retail water agencies. Conservation achieved through this methodology is referred to as code-based conservation. Since 1993, state law mandates that all toilets sold in California must flush no more than 1.6 gallons. It is estimated that between 1993 and 2004, over 153,000 toilets have been replaced with ULF models saving the local retail agencies over 6,000 acre-feet each year.¹

High Efficiency Clothes Washer Rebate

In 2002, IEUA and the local retail agencies introduced a High Efficiency Clothes Washer (HECW) Rebate Program. The program, conducted in conjunction with MWD, provides \$100 for the purchase and installation of a residential HECW. This program helps the regional water agencies meet their MOU obligations under BMP #6 which requires agencies to provide these types of incentive programs. To date, the program has provided over 4,800 rebates to residential customers. The water savings attributable to this program are estimated at 220 acre-feet annually.

Commercial – Industrial – Institutional

Within the IEUA service area, this category represents approximately 20% of the total water demand. Over the last five years, in cooperation with the local retail

¹ Assumes a 4% annual natural replacement rate.

agencies and the Metropolitan Water District, IEUA expanded its efforts in the Commercial/Industrial/Institutional (CII) sector by providing a rebate program for a menu of water using devices. These rebatable devices include ULF toilets and low-flow urinals, HECW's, cooling tower conductivity controllers, x-ray film processor recirculation units, pressurized water brooms, pre-rinse spray nozzles, and weather sensitive irrigation controllers. This program provides an important financial incentive to make it cost-effective for business and industry to participate in programs that reduce water use. For the local retail water agencies, this program helps them meet their MOU obligations under BMP #9.

Landscape

Over the last five years, irrigation technology has started to catch up with the water conservation needs of water agencies throughout California. Outdoor irrigation is the single largest water use for residential property owners and most commercial property owners. In California, landscape irrigation is about 50 percent of overall water use. In the IEUA service area, landscape irrigation demands are closer to 60 percent of a property's annual use.

Table 4-2 shows each of the 14 BMP's and breaks out those BMP's that are retail water agencies and/or wholesale water agency related.

**Table 4-2
List of Best Management Practices**

Retailer BMPs		Wholesaler BMPs	
BMP 1	Water Survey Programs For Single Family Residential and Multi-Family Residential Customers	BMP 3	System Water Audits
BMP 2	Residential Plumbing Retrofit	BMP 7	Public Information Programs
BMP 3	System Water Audits	BMP 8	School Education Programs
BMP 4	Metering with Commodity Rates For All New Connections and Retrofit of Existing Connections	BMP 10	Wholesale Agency Assistance Programs
BMP 5	Large Landscape Conservation Programs	BMP 11	Conservation Pricing
BMP 6	High Efficiency Clothes Washing Machine Financial Incentive Programs	BMP 12	Conservation Coordinator
BMP 7	Public Information Programs		
BMP 8	School Education Programs		
BMP 9	Conservation Program For Commercial, Industrial, and Institutional (CII) Accounts		
BMP 11	Conservation Pricing		
BMP 12	Conservation Coordinator		
BMP 13	Water Waste Prohibition		
BMP 14	Residential ULFT Replacement Programs		

With assistance from MWD, IEUA and the local retail water agencies began to offer regional and local classes for residents on landscaping efficiencies. IEUA participated with MWD on their “City Makeover” program to beautify city owned properties with California Native plant species. The City of Rancho Cucamonga and the Chino Basin Water Conservation District each won cash awards towards their projects. Also, IEUA has participated with MWD on its pilot program to promote landscape efficiencies in model homes. “The California Friendly Model Program” hopes to instill water use efficiencies in homes above current plumbing requirements.

Native Landscape Policy

In June 2003, the IEUA Board of Directors formally adopted a Native Landscape Policy. The policy states that IEUA will promote the use of native and drought tolerant plants. First and foremost, IEUA will serve as an example for the rest of the community by retrofitting our own facilities to use native plants whenever and wherever possible.

New technologies introduced in the last three years have opened the door to important funding opportunities such as MWD’s Pilot Weather Sensitive Irrigation Controller rebate program. IEUA and the local retail water agencies began a program in 2005 to provide rebates as an incentive to property owners to purchase and install a weather sensitive irrigation controller to help reduce chronic over watering.

These programs all help to provide support to the local retail water agencies to help them meet their MOU obligations under BMP #5.



IEUA HEADQUARTERS IN CHINO

Leading by example, IEUA’s Board of Directors approved the use of the LEED™ design criteria for its new headquarters to showcase how an integrated, sustainable designed building can create a better environment, conserve water and energy, improve productivity and contribute to the restoration of native landscapes.

School Education

In cooperation with its local agencies, IEUA expanded its efforts between 2000 and 2005 in promoting pilot conservation-related educational programs to grades K – 12. In 2002-03, IEUA began with a program to provide a magic show assembly that teaches water conservation oriented concepts to elementary level students. The program, “Think Earth; It’s Magic” followed up with an award winning curricula for each teacher and classroom called Think Earth.

The pilot program was instituted for two years and reached over 12,000 elementary level students. In 2004-05, IEUA and the local water agencies began a new program from the National Theatre for Children (NTC). The NTC group provides a live stage show that focuses on a water conservation theme. In the program’s first years, the stage show, “The Water Pirates of Neverland: Run Aground,” was seen at 49 schools and by more than 21,000 students. Next year’s program (FY 2005-06) will feature a new play but still continue the water conservation theme.



Butterfly Garden at Alta Loma Elementary School
in Rancho Cucamonga, a Project of Garden In Every School

In 2004, IEUA, in cooperation with the local retail water agencies, began a very unique program to provide “California Friendly” gardens to local elementary schools. The program, “A Garden In Every School” is an award winning program that brings professional expertise to teachers who want to use garden-based learning in their classrooms to teach science and conservation concepts.

With additional financial support from Lewis Operating Corporation and Kellogg’s Garden Products, the program also provides vegetable gardens for the students to learn basic gardening skills.

These programs all help to provide support to the local retail water agencies to help them meet their MOU obligations under BMP #7 and BMP #8 (School Education and Public Information).

Funding Sources

Funding sources for implementation of projects and programs to achieve the regional goals is a combination of IEUA revenues leveraged with outside funding

from MWD, DWR and Bureau of Reclamation. The 2000 UWMP adopted a funding strategy for the regional agencies that would have a minimal impact on each agency's budget, yet would provide an equitable flow of funding for the regional conservation programs. The revenues are set up to come from different sources so that no one or two large agencies would have to carry the burden for the entire region.

Since 2000, the number of individual revenue sources has increased. Below is a description of each of the funding sources:

- Imported Surcharge – IEUA agreed in 2000 to initiate a \$1 surcharge on each acre foot of imported water for water conservation. The surcharge is included on all classes of imported water (i.e., full service, conjunctive use, and replenishment). Currently, the surcharge is set at \$4 per acre foot for FY 2005-2006.
- Retail Meter Revenue – Metropolitan Water District (MWD) imposes a "Readiness to Serve Charge" on all member agencies to help pay for their CIP programs. To pay these fees to MWD, IEUA collects a charge for each residential and commercial meter in operation in the service area. IEUA attaches 2.5 cents per meter that flows directly to fund the conservation programs. Annually, this produces about \$55,000 in funding for the regional conservation programs.
- Property Tax – IEUA collects a property tax on each parcel in the service area to help pay for general fund and the regional sewage program. Exactly 1 cent of each 88 cents collected goes to conservation funding. Currently, this generates about \$75,000 in funding for the regional conservation program.
- Regional Sewerage Funding – Conservation programs can have a direct benefit on sewerage operations by reducing the overall volume of the wastewater flow. Therefore, the Regional Policy Committee (an advisory committee to IEUA made up of municipal and water district personnel) agreed to provide \$50,000 in funding to the regional conservation program since FY 2003-2004.
- Chino Basin Green – This \$100,000 is part of a \$300,000 grant from Lewis Operating Corporation to IEUA to establish a regional tree nursery and for support of regional landscape programs.

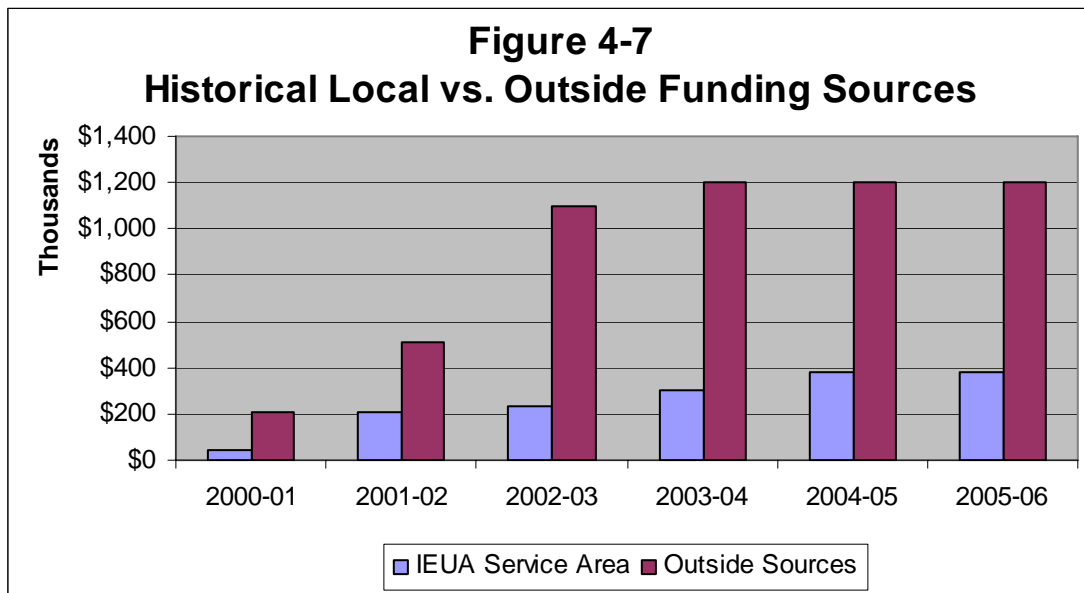
Table 4-3 is a description of the FY 2005-2006 budget for IEUA's regional conservation programs.

**Table 4-3
FY 2005/06 Regional Water Conservation Budget**

Program	IEUA Funding	MWD/Other Funding	2005/06 Budget Total
Large Landscape Audit Program <ul style="list-style-type: none"> Goal 150 CII Audits and 50 Residential Audits at estimated program cost of \$290/audit. Will offer MWD rebates and examine potential for additional rebates. Develop eligibility criteria for residential audits 	\$58,000	\$86,000	\$144,000
CII Program <ul style="list-style-type: none"> Goal: maximize Honeywell DMC/MWD rebates in service area Develop Marketing Strategy 	\$27,000	\$0 (MWD Rebates via DMC)	\$27,000
Toilet Programs Direct Rebate (2,000 toilets) (include dual flush rebate and offer residential showerheads/water survey) Single Day (1,000 toilets) Regional Exchange (1,600) Multi-Family Direct (3,200)	\$3,500 (1,800 x \$60) (200 DF x \$80) \$1,000 \$15,000 \$339,200	\$108,000 \$16,000 \$60,000 \$96,000 \$192,000	\$3,500 \$108,000 \$16,000 \$61,000 \$111,000 \$531,200
High Efficiency Clothes Washer 1,000 (Admin \$10)	\$0	\$110,000	\$110,000
Public Information Protector Del Agua (Link classes to residential audits. Reprint Education Materials Conservation Tips/Media	\$2,000 \$2,000 \$50,000		\$2,000 \$2,000 \$6,000 \$50,000
School Education Programs National Theatre for Children Garden In Every School <ul style="list-style-type: none"> Evaluate outside of IEUA Track participation level 	\$40,000 \$55,000		\$40,000 \$55,000
Retail Agency Assistance Programs CUWCC dues Chino Basin WCD BMP Support Grant WEWAC	\$11,000 \$1,000 \$2,000 \$1,500	10,000	\$11,000 \$1,000 \$2,000 \$1,500
Total	\$608,200	\$678,000	\$1,286,200

Figure 4-7 describes an example of local revenues and the ability to leverage those funds with outside funding. The regional conservation program has about \$600,000 to spend on program implementation. However, IEUA leverages these funds with rebate funding from the MWD and with state grants from DWR and the Bureau of Reclamation. In all, IEUA has an annual conservation budget that

exceeds \$1.2 million. To achieve water conservation goals outlined in this chapter, total annual spending will need to be increased to over \$2 million. Additional funding assistance will be sought from entities such as MWD, State Water Resources Control Board, DWR and the Bureau of Reclamation.



Accomplishments

Over the last five years, IEUA and its regional partners have introduced a variety of new conservation programs that have led to significant accomplishments in conservation. These new programs have consisted of incentive programs for homeowners and businesses, landscape efficiency programs and education programs. Most of these programs have been very successful; others were introduced as pilot programs or are just in the beginning stages on implementation. Below is a list of accomplishments by IEUA and the retail water agencies:

- In April 2001, IEUA and the retail agencies began an Ultra-Low Flush (ULF) toilet rebate program. This program has rebates the purchase and installation of over 2,300 ULF toilets.
- Beginning in 1992, IEUA and the retail agencies began a series of annual ULF toilet exchange programs. Through 2005, over 23,000 ULF toilets have been installed in single-family homes. These toilets are saving over 721 acre-feet of water each year.
- In 2001, IEUA and the retail agencies began a ULF toilet rebate program. To date, over 2,300 rebates have been issued saving over 72 acre-feet each year.

- Beginning in 2001, IEUA and the retail agencies have conducted a High-Efficiency Clothes Washer rebate program. Over 5,100 rebates were issued saving nearly 100 acre-feet each year.
- In 2003, IEUA and the retail agencies became the only water agency in California to offer rebates for Swimming Pool Covers. In all, over 600 rebates were issued. The swimming pool covers are estimated to save over 16 acre-feet year over the five-year life of the covers.
- In 2004, IEUA and the retail agencies began a region wide education program with the National Theatre for Children. The program includes live stage performances by trained actors at 50 elementary schools each year. To date, over 21,000 students saw the water education, water-conservation based productions.
- IEUA began a program to construct native landscape gardens in elementary schools. "A Garden in Every School" program includes garden-based curriculum that teachers use to teach various science concepts. In 2005, the first year of the program, IEUA planted 7 gardens at 7 schools.
- Through a Proposition 13 grant from the California Department of Water Resources, IEUA placed 11 X-Ray Film recirculation devices at hospitals and diagnostic centers that reduces water use by 96 percent on each film processor saving over 33 acre-feet each year.
- In 2003, IEUA and the retail agencies began a series of residential landscape classes. Many of the agencies hosted classes for their own customers and residents while IEUA hosted regional classes for all residents in the service area.
- IEUA has continued to participate in WEWAC (Water Education Water Awareness Committee). Since 1989, WEWAC has promoted school education through teacher and student grants on a variety of water based subjects. IEUA participates with 12 other water agencies in San Bernardino County and Los Angeles County.
- In June 2005, IEUA was awarded \$1.7 million for Proposition 50 Water Efficiency grant. This grant, provided by the California Department of Water Resources, gives IEUA the ability to install over 22,000 ultra-low flush toilets in multi-family properties throughout the service area over a three year period.

The retail agencies not participate in conservation program at the regional level but some agencies have their own events and programs as well. Below is a list of the participating programs for each of the eight retail water agencies in the IEUA service area.



City of Chino

- Ultra-Low Flush (ULF) Toilet Exchange
- ULF Toilet Rebate
- High Efficiency Clothes Washer (HECW) Rebate
- National Theatre for Children
- Commercial/Industrial/Institutional (CII) Rebate (Save-A-Buck)
- Garden In Every School
- Landscape Water Audits
- Water Awareness Water Education Committee (WEWAC)



City of Chino Hills

- Edible Aquifer School Program
- Metropolitan Water District's (MWD) Solar Cup
- School Poster Contest
- WEWAC
- ULF Toilet Exchange
- ULF Toilet Rebate
- HECW Rebate
- National Theatre for Children
- CII Rebate (Save-A-Buck)
- Garden In Every School
- Landscape Water Audits
- Residential Landscape Classes



Cucamonga Valley Water District

- MWD's Solar Cup

- Kids Environmental Festival
- WEWAC
- Teacher Workshops
- ULF Toilet Exchange
- ULF Toilet Rebate
- HECW Rebate
- National Theatre for Children
- Commercial/Industrial/Institutional (CII) Rebate (Save-A-Buck)
- Garden In Every School
- Landscape Water Audits
- Residential Landscape Classes



Fontana Water Company

- ULF Toilet Exchange
- ULF Toilet Rebate
- HECW Rebate
- CII Rebate (Save-A-Buck)
- Garden In Every School



Monte Vista Water District

- School Poster Contest
- Speakers Bureau
- WEWAC
- ULF Toilet Exchange
- ULF Toilet Rebate
- HECW Rebate
- National Theatre for Children
- CII Rebate (Save-A-Buck)
- Garden In Every School
- Landscape Water Audits
- Residential Landscape Classes



City of Ontario

- WEWAC
- Ontario Cares
- ULF Toilet Exchange
- ULF Toilet Rebate
- HECW Rebate
- National Theatre for Children
- CII Rebate (Save-A-Buck)
- Garden In Every School
- Landscape Water Audits



City of Upland

- WEWAC
- ULF Toilet Exchange
- ULF Toilet Rebate
- HECW Rebate
- National Theatre for Children
- CII Rebate (Save-A-Buck)
- Garden In Every School
- Landscape Water Audits



San Antonio Water Company

- ULF Toilet Rebate
- ULF toilet Exchange
- CII Rebate (Save-A-Buck)
- Landscape Water Audits

4.6 CONSERVATION PROGRAMS 2005-2025

The IEUA will continuously develop new conservation programs over the next twenty years. Developing technology, opportunities, and funding will dictate the direction of these programs. However, the foundation for future conservation programs will be based upon the work that started in 2001 and the investigative work over the next five years.

Objectives

As mentioned in section 4.4, IEUA has identified five core strategies it will pursue over the next five years. This will be a transitional period where conservation programs will be fully integrated into IEUA's other water management programs. Below is a list of the objectives for each of the core strategies:

Integrate Water Conservation with other Water Management Programs

- Integrate water conservation with recycled water through large landscape audit programs by identifying potential customers.
- Integrate water conservation with organics management by promoting the "Healthy Soils" concept for all landscapes in the IEUA service area.
- Integrate water conservation with salinity management by promoting the water quality benefits of reduced salt in the wastewater stream.
- Integrate water conservation with flood control and groundwater management by promoting methods to increase on-site storm water retention.

Water Efficiency in New Development

- Integrate water efficiency with the "California Friendly" concept by encouraging developers to construct all new homes with water conserving landscaping and irrigation equipment.
- Integrate energy efficiency with the "California Friendly" concept by encouraging developers to install indoor appliances that use the highest efficiency standards.
- Promote incentives to new homeowners to develop their backyards using weather-based irrigation controllers and water efficient landscape design criteria.

Promotion of “California Friendly” in Existing Development

- Integrate the California Friendly concept through a regional landscape water audit program.
- Integrate the California Friendly concept through promotion of residential landscape audit classes.
- Integrate the California Friendly concept through promotion of the commercial and residential weather-based irrigation controller rebate program.
- Develop an award program, with Metropolitan Water District, for properties that become “California Friendly”.

Continue Residential Appliance Retrofit Programs

- Continue ultra-low flush (ULF) toilet rebates while transitioning to incentive programs for dual-flush toilets and high efficiency toilets (HET).
- Continue with rebates for residential high-efficiency clothes washers (HECW) until formal standards are adopted by the state.
- Continue to offer rebates for weather based irrigation controllers.

Expand Public Education Programs

- Continue to develop and offer incentives to schools for participation in the “Garden In Every School” program to promote garden based learning.
- Continue to offer the National Theatre for Children program for up to 50 elementary schools annually in the IEUA service area.
- Develop partnerships with school districts to help them promote water and energy efficiency to school children as well as resource management concepts that include recycled water, healthy soils, and the importance of water quality.

Research and Development

Over the next five years, IEUA will research the water conservation potential of programs that may have been started on a pilot basis in other areas of the state, but have not yet been fully implemented. These types of programs and concepts will be related to the BMP’s. During the research phase, some of the questions that need to be explored are as follows:

- Where has this program been implemented?
- What area are the projected water savings?
- What are the costs compared to the benefits?
- What resources are necessary for implementation?

Below is a description of types of programs that will be studied over the next five years. Implementation of these programs, if found to be feasible, will over the next five to ten years.

➤ **Rebates for Residential/Commercial Irrigation System Improvements** – It is well understood that an irrigation system which has not been maintained will not function as well as one that has been properly maintained. IEUA will investigate the possibility of a rebate program for property owners who wish to improve or upgrade their irrigation systems.

➤ **Turf Removal** – Turf removal and landscape replacement programs are becoming more popular among residents of Southern California, replacing a high water demanding landscape with more efficient landscape means. An example where this has been successful in Las Vegas, Nevada. In a very aggressive effort to reduce irrigation water use, the Southern Nevada Water Authority (SNWA) provides a rebate of \$1 per square foot of turf removed and is replaced with low water-using landscapes. The SNWA has replaced over 34 million square feet of turf. In 2004, SNWA spent \$28 million on this program. Through a joint 5-year study with the U.S. Department of the Interior, the SNWA determined a water savings rate of 55 gallons per square foot annually. This is about 5,700 acre-feet of savings each year. IEUA will investigate the potential for removing turf in favor of low or zero water using landscape.

➤ **Artificial Turf Replacement** – Living turf removal in favor of artificial turf has already begun in parts of Southern California, including specific sites in the Chino Basin (Upland High School football field). The advantage of such of a



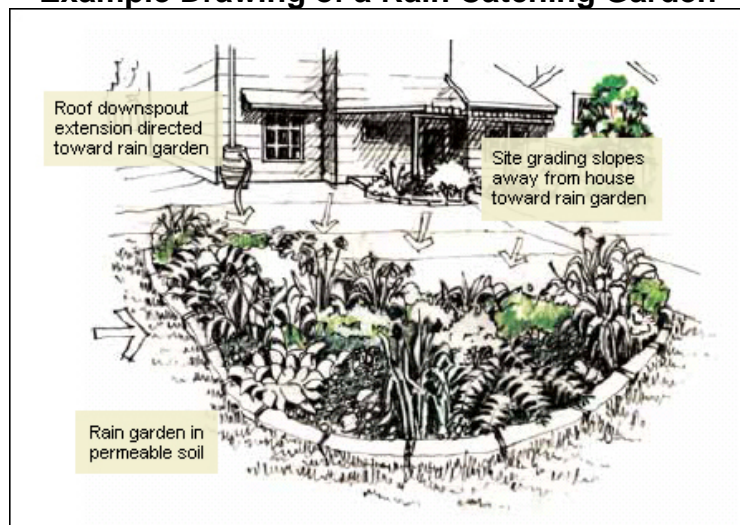
Example of a home using artificial turf

landscape to the property owner is not only the water savings, but the maintenance savings as well. The costs of a retrofit can be quite high, up to \$10 per square foot. However, as these types of landscapes become more popular, the costs will likely begin to fall. IEUA will investigate the viability of a rebate program for homeowners

and commercial property owners.

- **Technical Assistance Programs** - As part of BMP #10 (Wholesale Agency Assistance), IEUA is required to provide technical and/or financial assistance to the retail water agencies to help them implement the BMPs. IEUA is already offering this type of assistance currently, but will review other areas we can expand to such as Rate Structure assistance and local legislative assistance such as Retrofit-Upon-Resale ordinances.
- **Expand School Education Program to Include a Home Water Audit Component** - As already mentioned in school education, children can be a powerful tool in convincing their parents to be more resources efficiency minded. IEUA will look at the possibility of expanding the National Theatre for Children school education program to include a home water survey/audit component. After viewing the live action performance, students (fifth grade or higher) could be provided the materials to conduct a home water audit at their own home and enter the data on a special secure website. The data could be used to market directly to parents about the existence of rebates or other incentives they may not be aware of or have not yet taken advantage of. IEUA will explore this with the National Theatre for Children staff.
- **Rain Catching Gardens** - As the Chino Basin continues to urbanize, more and more properties are creating more runoff of storm water that would have simply infiltrated into the ground and ultimately percolated into the Chino Groundwater Basin. As shown in Figure 4-8, a rain garden is a shallow depression in your yard that is planted with native flowers & grasses and is positioned in the yard to receive runoff from your roof, sidewalks, driveway and lawns allowing water to slowly soak into the ground. Residential and commercial property owners should be encouraged and/or incentivised to create this type of landscape that allows water to naturally percolate into the Chino Groundwater Basin.

Figure 4-8
Example Drawing of a Rain Catching Garden



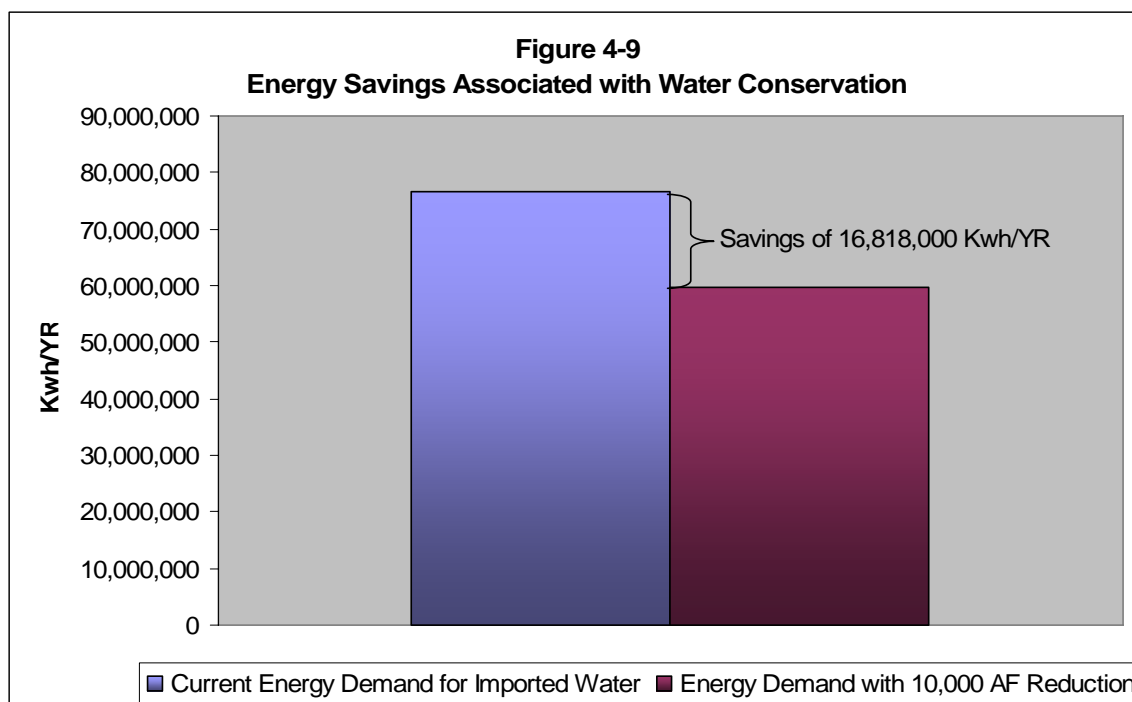
IEUA will investigate what type of incentives would be necessary to create a series of these rain catching gardens.

Regional Energy Benefits

Water and energy are like two sides of the same coin. They are linked together in almost every scenario. When water use increases, so does energy use. The artificial movement of water is the single greatest use of power in California. As energy becomes more expensive, the cost to move water from one place to another rises, and the need to conserve becomes even greater. When we reduce our water use, even by a small amount, we can reduce our costs for energy; we reduce demand on the regional grid system of energy supply, and reduce air pollution.

In 2003, the Pacific Institute for Studies in Development, Environment, and Security developed a model to show the multiple energy benefits of water conservation. Figure 4-9 provides a look at the energy savings that will occur when we reduce our water use through conservation. Using the model, we find that a reduction of 10,000 acre-feet per year of imported water will save almost 16.8 million kilowatt hours annually.

To put these energy savings into perspective, 16.8 million kilowatt hours is enough to meet the energy needs of about 1,650 average single-family homes for one year.



In addition to energy savings, there are measurable reductions in air pollution as well. For each 10,000 acre-foot reduction in imported water, the IEUA service area will:

- Reduce Carbon Dioxide emissions by 7.9 billion grams per year;
- Reduce Carbon Monoxide emissions by 3.5 million grams per year;
- Reduce Nitrogen Oxide emissions by 1.7 million grams per year;
- Reduce Sulfur Oxide emissions by 165,000 grams per year;
- Reduce Total Organic Gases by 1 million grams per year; and
- Reduce Total Particulates by 362,000 grams per year.

To put the above reductions into perspective, saving 10,000 acre-feet of imported water reduces emissions that are equivalent to taking up to 916 cars off the road.

4.7 ACTION PLAN

Below is a series of proposed actions that IEUA and the agencies of the Regional Water Conservation Partnership Workgroup will follow over the next five years to implement regional water conservation strategy.

- Develop existing and new conservation programs that assist the retail water agencies in complying with the Statewide Memorandum of Understanding (MOU) regarding Best Management Practices (BMP).
- Develop existing and new conservation programs that achieve a 10 percent reduction in annual water use over the next five years.
- Increase local conservation program revenues from \$400,000 to \$1 million by increasing the allocation of property taxes, increasing the funding level from the Regional Sewerage Fund, and increasing the imported water surcharge to \$8 per acre-foot over the next five years.
- Expand the IEUA staff sufficiently to meet the regional conservation program goals.
- Integrate existing and new conservation programs over the next five years into other resource management programs such as water recycling, healthy soils, and water quality.

CHAPTER 5

RECYCLED WATER PROGRAM

5.1 OVERVIEW

IEUA began serving recycled water in 1972. Initially recycled water was delivered to a few large water users such as the Whispering Lakes Golf Course and Westwind Park in Ontario and Prado Park and Golf Course in Chino.

Beginning in the early 1990's IEUA began the construction of the first phase of the Carbon Canyon Recycled Water Project (CCRWP) which included treatment facilities and distribution pipelines to serve customers in Chino and Chino Hills. In conjunction with the construction of the first phase of the CCRWP, IEUA began planning for a regional recycled water delivery system to provide recycled water throughout its service area. This planning effort culminated with the completion of the IEUA Regional Recycled Water Program Feasibility Study in January 2002. The Feasibility Study identified facilities to deliver over 70,000 acre-feet of recycled water per year (AFY) to customers and recharge sites throughout the IEUA service area.

In 2004 IEUA developed a regional recycled water program implementation plan to prioritize the phased construction of the adopted 2002 Recycled Water Program Feasibility Study.

This major planning effort resulted in the completion of the 2005 Recycled Water Implementation Plan (RWIP). The RWIP identified projects to deliver recycled water of approximately 90,000 AFY utilizing an interconnected distribution pipeline system supplied from all four of IEUA's major recycled water plants.

The plan identified a phased implementation over the next ten years with provisions for additional expansion beyond the ten year planning horizon. The estimated cost of the facilities planned for the next ten years is approximately \$110 million (adopted IEUA Ten Year CIP, June 2005). The projects will be funded through a combination of state and federal grants, state low-interest loans, MWD LRP rebates and Regional Sewage Program funds. The actual schedule of implementation was identified in the adopted Fiscal Year 2005-2006 Ten Year CIP and will be updated each year based on the availability of grant funding and the coordination with the retail water agencies on customer demands.

5.2 REGIONAL RECYCLED WATER PROGRAM

The 2002 Feasibility Study and 2005 Implementation Plan included a market assessment of the potential recycled water customers within the IEUA service area. Working with the cities and retail water agencies over 2,300 potential customers were identified. This information was used to plan the regional and local recycled water distribution pipelines. Pipeline locations were selected to provide recycled water to the largest customers or groups of customers. Ultimately, the distribution system will serve over 1,900 of the largest customers and an overall supply of approximately 104,000 AFY, which includes about 35,000 AFY for Chino Basin groundwater recharge.

Regional Recycled Water Facilities

In September 2000 the IEUA Board and Regional Technical and Policy Committees adopted a recycled water policy document which defined the roles and responsibilities of IEUA and the Regional Contracting Agencies for the construction and ownership of the regional and local facilities. Regional facilities are defined as facilities, pipelines, and pump stations, and reservoirs which serve recycled water to a recharge site or to more than one contracting agency. Regional facilities will be constructed and owned by IEUA. Local facilities will deliver recycled water from the regional facilities to customers within a contracting agency's service area and will be their responsibility. Local facilities will primarily be pipelines (local laterals) but may also include local pump stations and reservoirs. The Recycled Water Implementation Plan (2005) will refine these policies regarding funding of local storage facilities that reduce regional storage needs, including provisions for joint regional/local facilities (local retail water agency or developer), and IEUA financing arrangements of local facilities and customer on-site retrofits to ensure the timely implementation of the recycled water program.

The Regional Recycled Water Facilities will consist of a looped pipeline system that connects all four Regional Water Recycling Plants as shown on Figure 5-1. Future satellite plants, generally identified in the Wastewater Master Plan adopted in 2002, will be evaluated in coordination with the retail water agencies and the Regional Technical Committee. The regional facilities include over 50 separate pipelines, pump station and reservoir projects (see Table 5). These projects have been grouped into eight implementation phases. The priority of each phase was determined based on the amount of recycled water each phase could serve and the proximity of each phase to one of the regional water recycling plants or existing recycled water transmission mains. Phase A and B of the program will deliver recycled water to most of the recharge sites since the recharge sites represent a significant recycled water use.

Local Recycled Water Facilities

As described above, local recycled water facilities are those which serve the customers of only one contracting agency. Each local agency is responsible for the planning, design, construction and operation of local laterals within their service area. IEUA staff is working closely with each agency to coordinate their recycled water planning efforts. In order to assist the local agencies with the implementation of their recycled water systems, IEUA is providing technical assistance and, if requested, financing of the local agency's facilities. Funds for this financing are in IEUA's budget and Ten Year Capital Improvement Plan (TYCIP), however, the amount of funding will depend on the agencies' needs. Similar financing was used for the construction of the CCRWP in the 1990's.

Regional Recycled Water Program Summary

Table 5-1 summarizes the phasing of construction costs, capital costs and the recycled water demands for Priority A through G projects:

**Table 5-1
Capital Improvement Program for Recycled Water**

Projects	Metric	Demand (acre-ft/yr)	Cumulative Demand (acre-ft/yr)	Construction Cost (\$ Million)	Capital Cost (\$ Million)	Priority
Existing Pipelines	Length (ft.)	31,885	31,885	\$29.6	\$44.8	A
Edison	34,100	2,358		\$10.4	\$15.7	A
1158 Reservoir	3,000	0		\$1.6	\$2.4	A
San Antonio Channel	29,200	5,513		\$8.4	\$12.7	A
Reservoir Projects	Size per Tank (MG)					
1158 and RP-4 Reservoir Retrofit 1	5.5			\$1.7	\$2.5	A
1158 and RP-4 Reservoir Retrofit 2	5.5			\$1.7	\$2.5	A
Booster Stations	Size (HP)					
1270 Zone East Booster Station Phase 1	650			\$1.1	\$1.7	A
RP-4 1158 Booster Station Phase 1	650			\$1.1	\$1.7	A
RP-1 930 Zone Booster Station Phase 1	930			\$3.0	\$4.5	A
PRV Station	Capacity (gpm)					
Station on RP-1 Outfall (2 16" valves)	8,000			\$0.4	\$0.6	A
Station from 1158 to 1050 (2 16" valves)	7,000			\$0.3	\$0.5	A
Total Priority A Projects		7,871	39,756	\$29.6	\$44.8	A
Pipeline Projects	Length (ft)					

Projects	Metric	Demand (acre-ft/yr)	Cumulative Demand (acre-ft/yr)	Construction Cost (\$ Million)	Capital Cost (\$ Million)	Priority
Bickmore	10,800	0		\$1.8	\$2.7	B
Etiwanda 1270 East	6,400	0		\$2.8	\$4.1	B
7 th /8th Street Basin	10,300	1,919		\$1.6	\$2.4	B
Etiwanda 1430 East	7,400	1,741		\$2.6	\$3.9	B
Victoria Basin	4,100	1,460		\$1.5	\$2.2	B
Reservoir Projects	Size per Tank (MG)					
1270 East Reservoir Phase 1	5.5			\$3.0	\$4.5	B
Booster Station Projects	Size (HP)					
1430 Zone East Booster Station Phase 1	1,000			\$1.3	\$2.0	B
Land Acquisition	Size (acres)					
1270 East Reservoir Phase 1 & 2	5.6			\$2.8	\$2.8	B
Total Priority B Project		5,120	44,876	\$17.4	\$24.6	B
Pipeline Projects	Length					
Bickmore West	16,100	248		\$4.5	\$6.8	C
800 West Reservoir	10,500	85		\$3.7	\$5.5	C
Wineville Extension	5,300	419		\$0.9	\$1.3	C
Reservoir Projects	Size per Tank (MG)					
800 West Reservoir	10.0			\$5.4	\$8.2	C
Booster Station Projects	Size (HP)					
RP-5 930 Zone Booster Station	1,700			\$2.2	\$3.4	C
Land Acquisition	Size (acres)					
800 West Reservoir	4.4			\$2.2	\$2.2	C
Total Priority C Projects		752	45,628	\$18.9	\$27.4	C
Pipeline Projects	Length (ft)					
RP-1 Outfall Parallel	27,700	8,548		\$13.1	\$19.7	D
Reservoir Projects	Size per Tank (MG)					
930 East Reservoir Phase 1	7.5			\$4.0	\$6.1	D
Land Acquisition	Size (acres)					
930 East Reservoir Phase 1 & 2	6.4			\$3.2	\$3.2	D
Total Priority D Projects		8,548	54,176	\$20.4	\$29.0	D

Projects	Metric	Demand (acre-ft/yr)	Cumulative Demand (acre-ft/yr)	Construction Cost (\$ Million)	Capital Cost (\$ Million)	Priority
Pipeline Projects	Length (ft)					
Etiwanda South	8,000	2,239		\$1.4	\$2.1	E
Arrow Phase 1	21,000	2,405		\$6.9	\$10.4	E
Etiwanda Spreading Basins	8,800	1,755		\$2.2	\$3.3	E
San Sevaine Spreading Basin	2,700	2,215		\$0.6	\$0.9	E
Reservoir Projects	Size per Tank (MG)					
1430 East Reservoir	5.0			\$2.7	\$4.1	E
Booster Station Projects	Size (HP)					
1630 Zone East Booster Station Phase 1	950			\$1.3	\$2.1	E
Land Acquisition						
1430 East Reservoir	2.7			\$0.4	\$0.4	E
Total Priority E Projects		8,614	62,790	\$15.6	\$23.3	E
Pipeline Projects	Length					
Sultana	30,300	5,272		\$8.3	\$12.5	F
Booster Station Projects	Size (HP)					
1270 Zone West Booster Station	3,000			\$3.9	\$5.9	F
Land Acquisition	Size (acres)					
1270 Zone West Booster Station	0.3			0.2	\$0.2	F
Total Priority F Projects		5,272	68,062	\$12.4	\$18.6	F
Pipeline Projects	Length (ft)					
930 West Reservoir	17,600	0		\$6.1	\$9.2	G
800 East Reservoir	800	4,948		\$0.4	\$0.5	G
Arrow Segment 2	16,400	1,693		\$3.2	\$4.9	G
Napa	2,800	5,700		\$0.6	\$0.9	G
Reservoir Projects	Size per Tank (MG)					
800 East and RP-1 Reservoir	7.5			\$4.1	\$6.2	G
930 West Reservoir	9.5			\$5.1	\$7.8	G
Land Acquisition	Size (acres)					
930 West Reservoir	4.3			\$2.1	\$2.1	G

Projects	Metric	Demand (acre-ft/yr)	Cumulative Demand (acre-ft/yr)	Construction Cost (\$ Million)	Capital Cost (\$ Million)	Priority
Total Priority G Projects		12,341	80,403	\$21.6	\$31.5	G
Pipeline Projects	Length (ft)					
JCSD	5,900	800		\$1.1	\$1.7	H
930 West El Prado	9,000	0		\$2.5	\$3.7	H
Francis Segment 1	10,600	606		\$1.7	\$2.5	H
Francis Segment 2	12,100	533		\$1.6	\$2.4	H
Etiwanda 1270 East Parallel	3,100	0		\$0.9	\$1.3	H
1270 West Reservoir	9,800	86		\$2.7	\$4.1	H
1430 West	45,200	918		\$8.3	\$12.6	H
1630 Day Creek	5,900	712		\$2.1	\$3.1	H
1630 East Reservoir	3,000	189		\$1.3	\$2.0	H
1630 Fontana	1,900	1,488		\$0.5	\$0.7	H
1630 Highland	5,600	134		\$1.6	\$2.5	H
1630 West	47,700	2,679		\$8.7	\$13.1	H
1830 East	12,800	3,765		\$2.4	\$3.6	H
1830 West	37,900	725		\$6.9	\$10.5	H
Reservoir Projects	Size per Tank (MG)					
930 East Reservoir Phase 2	7.0			\$3.8	\$5.7	H
1158 and RP-4 New Reservoir	6.0			\$3.2	\$4.9	H
1270 East Reservoir Phase 2	5.5			\$3.0	\$4.5	H
1270 West Reservoir	5.0			\$2.7	\$4.1	H
1430 West Reservoir	3.5			\$2.1	\$3.2	H
1630 East Reservoir Phase 1	7.0			\$3.8	\$5.7	H
1630 East Reservoir Phase 2	7.0			\$3.8	\$5.7	H
1630 West Reservoir	4.5			\$2.4	\$3.7	H
1830 Reservoir	5.0			\$2.7	\$4.1	H
RP-5 Reservoir	3.5			\$2.1	\$3.2	H
Booster Station Projects	Size (HP)					
1270 Zone East Booster Station Phase 2	450			\$0.9	\$1.4	H
1430 Zone East Booster Station Phase 2	650			\$1.1	\$1.7	H
1430 Zone West Booster Station	500			\$1.0	\$1.5	H

Projects	Metric	Demand (acre-ft/yr)	Cumulative Demand (acre-ft/yr)	Construction Cost (\$ Million)	Capital Cost (\$ Million)	Priority
1630 Zone East Booster Station Phase 2	650			\$1.1	\$1.7	H
1630 Zone West Booster Station	500			\$1.0	\$1.5	H
1830 Zone East Booster Station	450			\$0.9	\$1.4	H
1830 Zone West Booster Station	100			\$0.4	\$0.7	H
RP-1 930 Zone Booster Station Phase 2	500			\$1.0	\$1.5	H
RP-4 1158 Booster Station Phase 2	750			\$1.2	\$1.9	H
RP-5 800 Zone Booster Station	800			\$1.3	\$2.0	H
CCWRF 930 Zone Booster Station	750			\$1.2	\$1.9	H
Land Acquisition	Size (acres)					
1270 West Reservoir	3.0			\$1.5	\$1.5	H
1430 West Reservoir	2.6			\$1.8	\$1.8	H
1630 West Reservoir	3.0			\$2.0	\$2.0	H
1630 East Reservoir Phase 1 & 2	6.3			\$1.1	\$1.1	H
1830 Reservoir	3.1			\$0.5	\$0.5	H
1830 Zone East Booster Station	0.3			\$0.2	\$0.2	H
1830 Zone West Booster Station	0.3			\$0.2	\$0.2	H
Total Priority H Projects		12,635	93,038	\$90.0	\$133.1	H
All Projects – Priority A through G		80,403		\$135.8	\$199.3	
All Projects – Priority A through H		93,038		\$225.8	\$332.4	

5.3 WASTEWATER TREATMENT

IEUA manages the Regional Sewage Service System within its 242-square miles service area to collect, treat and dispose of wastewater delivered by contracting local agencies. IEUA's facilities serve seven contracting agencies: the cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Cucamonga Valley Water District and Upland. A system of regional trunk and interceptor sewers convey sewage to regional wastewater treatment plants which are all owned and operated by IEUA. Local sewer systems are owned and operated by local agencies.

5.4 WASTEWATER TREATMENT PLANTS

IEUA operates four regional water recycling production plants: (Regional Plant No. 1 (RP-1), Regional Plant No. 4 (RP-4), Regional Plant No. 5 (RP-5), and the Carbon Canyon Water Reclamation Facility (CCWRF). A fifth treatment plant, RP-2, was decommissioned in 2004 because it was in a potential flood zone as a result of the Prado Dam project.

RP-1

Regional Treatment Plant No. 1 began operation in 1948 through a joint powers agreement between the cities of Ontario and Upland. IEUA, then known as Chino Basin Municipal Water District, purchased RP-1 in January 1973. It's the current capacity is 44 mgd and is projected to be expanded to an ultimate of 60 mgd after 2020 (IEUA Wastewater Facilities Master Plan, 2002). RP-1 serves all or part of the cities of Ontario, Rancho Cucamonga, Upland, Montclair, Fontana and unincorporated areas of San Bernardino County.

RP-2

Regional Treatment Plant No. 2 (RP-2) began operation in 1960 to serve the City of Chino and the Chino Hills area. It was expanded to 5 mgd to increase capacity and to meet stringent water quality requirements. Because RP-2 sits in a flood prone area, much of the facility has been shut down and all liquid wastes diverted to the new RP-5 facility. RP-2 continues to handle wastewater biosolids generated by RP-5 and CCWRF.

CCWRF

The Carbon Canyon Wastewater Reclamation Facility (CCWRF) has been in operation since 1992. The recycled water plant capacity is 11.4 mgd, while solids are treated at RP-2. CCWRF serves the cities of Chino, Chino Hills, Montclair and Upland.

RP-4

Regional Treatment Plant No. 4 was completed in 1997. This facility has a current capacity of 7 mgd and is being expanded to 14 mgd (scheduled for completion in mid 2007). RP-4 serves the Cucamonga Valley Water District, the City of Fontana and unincorporated areas of San Bernardino County in the northeast portion of the IEUA service area. An additional expansion to 21 mgd is projected to be completed by 2012.

RP-5

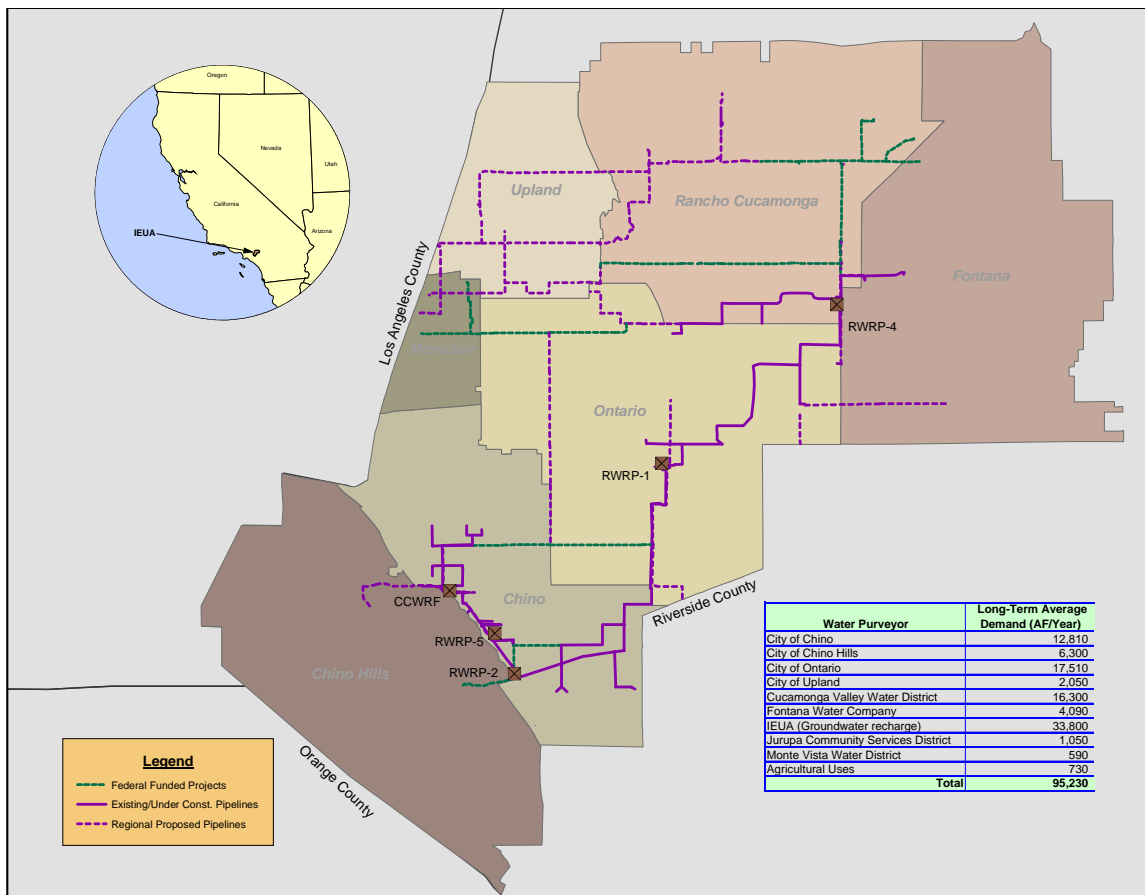
Regional Treatment Plant No. 5 (RP-5) began operation in March 2004. The 15 mgd plant serves existing development and the planned development occurring in the cities of Chino, Chino Hills and Ontario. It is anticipated that RP-5 will be expanded to approximately 27 mgd in 6 to 8 years.

REGIONAL RECYCLED WATER DISTRIBUTION SYSTEM FLEXIBILITY AND RELIABILITY

The configuration for the Regional Recycled Water Distribution System is planned as a looped, interconnected system to ensure supply reliability to customers and to maximize the delivery flexibility to recharge facilities.

Figure 5-1 shows the location of regional wastewater treatment plants and the existing and potential recycled water distribution lines.

Figure 5-1
Recycled Water Distribution Lines and Regional Plants



As shown in Table 5-2, the combined production of the current wastewater treatment plants is 68,000 AFY (60.8 mgd). By 2020, the plants are expected to produce 107,400 AF of water (95.5 mgd).

Table 5-2
Potential Recycled Water Supply

Regional Plants	Year 2005		Year 2010		Year 2015		Year 2020	
	Plant Capacity (AFY)	Plant Flow (AFY)	Plant Capacity (AFY)	Plant Flow (AFY)	Plant Capacity (AFY)	Plant Flow (AFY)	Plant Capacity (AFY)	Plant Flow (AFY)
CCWRF	12,700	9,850	12,700	11,800	12,700	12,100	12,700	12,100
RP-1	49,300	43,900	49,300	43,500	49,300	47,400	67,200	50,200
RP-4	7,800	6,940	15,700	13,800	23,500	21,200	23,500	21,200
RP-5	16,800	7,390	16,800	14,800	30,240	23,900	30,240	23,900
Total	86,600	68,080	94,500	83,900	115,740	104,600	133,640	107,400

Source: 2005 Recycled Water Implementation Plan

All of IEUA's wastewater treatment plants produce recycled water that meets or exceeds the requirements of the State of California Department of Health Services (DHS) Title 22 for recycled water. All wastewater goes through a treatment process before being discharged or reused.

The treatment process begins with raw sewage that is collected from the local cities. The raw sewerage is passed through screening and grit removal units, primary clarifiers, aeration basins, secondary clarifiers, chemical addition, tertiary filters, chlorination, and finally dechlorination facilities prior to discharge. Most of the effluent flow is placed into the nearby creeks and allowed to flow ultimately into the Santa Ana River where it is recharged into Orange County's groundwater basin.

Solids removed from the liquid treatment processes are thickened and stabilized in anaerobic digesters before being dewatered and transported to the Agency's co-composting facility in Chino.

IEUA maintains an EPA/State of California approved industrial pre-treatment program for industrial discharges to the sewage system that requires dischargers to comply with water quality objectives and to submit periodic monitoring reports to the Agency. IEUA produces a supply of highly polished tertiary-treated water suitable for irrigation, industrial water supply, groundwater recharge, environmental enhancement and unrestricted recreation use such as boating and fishing.

California Water Recycling Policy

Commencing with Chapter 7, Article 1, (Subsection 13500 et seq.) of Porter-Cologne, is known as the "Water Recycling Law," and is stated, in part, as follows (Subsection 13511):

"The legislature finds and declares that a substantial portion of the future water requirements of this state may be economically met by beneficial use of recycled water.

The legislature further finds and declares that the utilization of recycling water by local communities for domestic, agricultural, industrial, recreational, and fish and wildlife purposes will contribute to the peace, health, safety, and welfare of the people of the state. Use of recycled water constitutes the development of "new basic water supplies".....

5.5 EXISTING RECYCLED WATER PROGRAM

Currently, IEUA produces about 68,000 AF (60.8 mgd) of recycled water annually. In 2005, recycled water use totaled about 8,000 acre-feet (AF) of which 7,000 AF was used for outdoor irrigation and industrial processes and 1000 AF for groundwater recharge (during the summer of 2005, began expanding recharge of recycled water under the Phase 1 permit with initial deliveries at Banana and Hickory recharge facilities). During the next few years, recharge will increase rapidly. The remaining supply of recycled water, about 60,000 AF, was discharged to the Santa Ana River for reuse in Orange County.

As shown in Table 5-3, the recycled water used in 2000 came from RP-1/RP-4 and the CCWRF. A transmission line connects RP-1 and RP-4 and serves as part of the backbone system for recycled water use in the northern portion of IEUA's service area. This system provides water for irrigating parks and golf courses. CCWRF's distribution system delivers water through 21,400 linear feet of pipe, to the cities of Chino and Chino Hills. Currently, there are 125 recycled water connections to the recycled water distribution system. Table 5-4 identifies the current users of recycled water.

In the 2000 UWMP, IEUA provided projections for recycled water use in future years. Table 5-5 shows the comparison between what was projected for 2005 and the actual amount of recycled water used.

STATEMENT OF REUSE

"Recycled water can be used for a number of applications including Irrigation, Industrial Processes, Groundwater Recharge, and Environmental Enhancement. The goal of the IEUA is to achieve maximum reuse of all available recycled water."

**Table 5-3
Plant Supply vs. Recycled Water Usage**

Year	RP-1/RP-4		RP-2/RP-5		CCWRF		Upland Hills	
	Plant Flow	Recycled Water Usage	Plant Flow	Recycled Water Usage	Plant Flow	Recycled Water Usage	Plant Flow	Recycled Water Usage
1982-1983	20,790	1,550	4,290					
1983-1984	20,950	1,080	3,950					
1984-1985	25,160	1,267	4,280					
1985-1986	28,240	1,222	2,660					
1986-1987	27,160	1,306	5,000					
1987-1988	31,290	2,110	5,500					
1988-1989	35,510	2,038	6,180					
1989-1990	34,760	1,961	5,730					
1990-1991	36,840	1,792	6,100					
1991-1992	40,360	1,909	5,780		1,550			
1992-1993	41,510	1,205	5,640		4,720			
1993-1994	37,310	1,978	5,430		7,010			
1994-1995	39,680	3,794	5,360		8,690			
1995-1996	39,590	2,292	4,810		9,060			
1996-1997	39,940	2,075	4,790		9,750			
1997-1998	44,940	1,260	4,969		9,264			
1998-1999	43,354	2,444	5,345		9,534	100		
1999-2000	42,967	2,314	4,378		9,954	776		
2000-2001	43,863	2,916	4,401		11,615	924		
2001-2002	43,344	3,155	4,056		10,677	1,215	0.1	0.1
2002-2003	45,838	3,350	4,343		10,837	1,217	0.2	0.2
2003-2004	39,734	4,003	2,307		9,113	1,499	0.1	0.1
ALL VALUES IN ACRE-FEET								

**Table 5-4
Current Recycled Water Users**

Name	Water Use	User Type	Water Purveyor	Existing Demand (acre-ft/yr)
Whispering Lakes Golf Course	Irrigation	Golf Course	Ontario	1,036
CW Farms (Arthur Farms)	Agricultural	Agricultural	Chino	1,000
Prado Regional Park	Irrigation	Park	IEUA	1,000
Reliant Energy Plant	Industrial	Power Plant	CVWD	990
Murai Farms	Agricultural	Agriculture	Chino	600
Los Serranos Golf Course	Irrigation	Golf Course	Chino Hills	525
Ely Basins	Recharge	Spreading Basin	IEUA	500
El Prado Golf Course	Irrigation	Golf Course	IEUA	500
Durington Farms / Lewis Homes	Agricultural	Agricultural	Chino	500
City of Chino Ayala Park	Irrigation	Park	Chino	101
Caltrans I-10 Archibald	Irrigation	Landscape	Ontario	100
Rancho Monte Vista M.H.P.	Irrigation	Landscape	Chino Hills	98

Name	Water Use	User Type	Water Purveyor	Existing Demand (acre-ft/yr)
Big League Dreams	Irrigation	Park	Chino Hills	80
Westwind Park	Irrigation	Park	Ontario	80
Caltrans - SR-71	Irrigation	Landscape	Chino Hills	60
City of Chino Hills	Irrigation	City	Chino Hills	43
Cottonwood Dairy	Agricultural	Agricultural	Chino	40
Orange County Produce	Agricultural	Agricultural	IEUA	40
Garcia Farms	Agricultural	Agricultural	Chino	39
Service Craft LLC	Irrigation	Landscape	Chino	32
City of Chino Hills	Irrigation	City	Chino Hills	30
Engelsma Dairy	Irrigation	Landscape	Chino	30
Fairfield Ranch Park	Irrigation	Landscape	Chino Hills	30
IEUA Headquarters Irrigation	Irrigation	Irrigation	IEUA	26
City of Chino	Irrigation	Landscape	Chino	25
City of Chino Hills	Irrigation	Landscape	Chino Hills	25
Sundance Spas	Irrigation	Landscape	Chino	20
Majestic Management	Irrigation	Landscape	Chino	17
Norco Injection Molding	Irrigation	Manufacturing	Chino	16
Central Park Industrial Partners	Irrigation	Landscape	Chino	15
City of Chino Hills	Irrigation	City	Chino Hills	14
SF Enterprises LLC	Irrigation	Landscape	Chino	13
Artisan	Irrigation	Landscape	Chino Hills	12
Caltrans I-10 Archibald N	Irrigation	Landscape	Ontario	12
City of Chino Hills Car Wash	Irrigation	Landscape	Chino Hills	12
Albertsons, Inc. #6592	Irrigation	Supermarket	Chino Hills	11
City of Chino Hills	Irrigation	City	Chino Hills	11
Lewis Homes	Irrigation	Landscape	Chino Hills	11
Yoshimura R&D	Irrigation	Landscape	Chino	11
All Coast Forest Products	Irrigation	Manufacturing	Chino	10
Artisan	Irrigation	Landscape	Chino Hills	9
Bevles Company	Irrigation	Landscape	Chino	9
City of Chino Hills	Irrigation	City	Chino Hills	9
Edison Avenue Partners	Irrigation	Landscape	Chino	9
Mattel Inc	Irrigation	Landscape	Chino	9
Sundance Spas	Irrigation	Landscape	Chino	9
Bandag Inc	Irrigation	Manufacturing	Chino	8
City of Chino Hills	Irrigation	City	Chino Hills	8
Crossflow Logistics	Irrigation	Landscape	Chino	8
San Bdn Co Jr Fair Assn	Irrigation	Landscape	Chino	8
Yorba Industrial Center	Irrigation	Landscape	Chino	8
City of Chino Hills	Irrigation	City	Chino Hills	7
City of Chino Hills	Irrigation	City	Chino Hills	7
Fairfield Ranch	Irrigation	Landscape	Chino Hills	7
Trammel Crow So Cal Inc	Irrigation	Landscape	Chino	7
Warehouse Technology	Irrigation	Landscape	Chino	7
Lewis Homes	Irrigation	Landscape	Chino Hills	6
City of Chino Hills	Irrigation	City	Chino Hills	5
City of Chino Hills	Irrigation	City	Chino Hills	5
National Confectionery Brands	Irrigation	Landscape	Chino	5

Name	Water Use	User Type	Water Purveyor	Existing Demand (acre-ft/yr)
Trammel Crow So Cal Inc	Irrigation	Landscape	Chino	5
Trammel Crow So Cal Inc	Irrigation	Landscape	Chino	5
Trus Joist	Irrigation	Landscape	Chino	5
City of Chino Hills	Irrigation	Landscape	Chino Hills	4
City of Chino Valley Fire Dist.	Irrigation	Landscape	Chino Hills	3
City of Chino Hills	Irrigation	City	Chino Hills	3
Commerce Construction	Industrial	Construction	Chino	3
Elkay Watertech Division	Irrigation	Landscape	Chino	3
Hayward Industries	Irrigation	Landscape	Chino	3
Jacuzzi Brands Inc	Irrigation	Landscape	Chino	3
Lewis Homes	Irrigation	Landscape	Chino Hills	3
unknown	Industrial	Construction	Chino	3
Arco	Irrigation	Landscape	Chino Hills	2
Fairfield Ranch Median	Irrigation	Landscape	Chino Hills	2
Fairfield Ranch Median	Irrigation	Landscape	Chino Hills	2
Farrand Enterprises	Irrigation	Landscape	Chino	2
Panattoni	Irrigation	Landscape	Chino	2
Quetico Schaefer Properties	Irrigation	Landscape	Chino	2
Rapid Industrial Plastics	Industrial	Manufacturing	Chino	2
STC Plastics	Irrigation	Landscape	Chino	2
BRR HOA	Irrigation	Landscape	Chino Hills	1
BRR HOA	Irrigation	Landscape	Chino Hills	1
BRR HOA	Irrigation	Landscape	Chino Hills	1
CalTrans	Irrigation	Landscape	Chino Hills	1
CalTrans	Irrigation	Landscape	Chino Hills	1
CalTrans	Irrigation	Landscape	Chino Hills	1
City of Chino Hills	Irrigation	City	Chino Hills	1
City of Chino Hills	Irrigation	City	Chino Hills	1
City of Chino Hills	Irrigation	City	Chino Hills	1
City of Ontario	Irrigation	Landscape	Ontario	1
Colonial Electric	Industrial	Manufacturing	Chino	1
DBRS Medical System	Irrigation	Landscape	Chino	1
Dennys	Irrigation	Landscape	Chino Hills	1
Garrett Concrete	Irrigation	Landscape	Chino	1
Gro-Power Inc	Irrigation	Landscape	Chino	1
K-Care	Irrigation	Landscape	Chino Hills	1
Mattel Inc	Irrigation	Landscape	Chino	1
Shamrock Marketing	Irrigation	Landscape	Chino	1
City of Chino Hills	Irrigation	Landscape	Chino Hills	<1
Commerce Construction	Industrial	Construction	Chino	<1
Construction	Industrial	Dust Control	Chino Hills	<1
EKO System	Industrial	Compost Site	IEUA	<1
Total				7,942

**Table 5-5
IEUA 2000 Recycled Water Use Projection for 2005 vs. Actual**

Use Type	2000 Projection for 2005	Actual for 2005 ¹
Recharge	10,000	500
Industrial	3,000	1,002
Municipal	9,500	4,221
<u>Agriculture</u>	<u>300</u>	<u>2,219</u>
Total	22,800	7,942

¹Data from IEUA's 2005 Recycled Water Implementation Plan

5.6 RECYCLED WATER PROGRAM IN DEVELOPMENT

Available recycled water supplies are projected to reach 107,400 AFY in 2020. In conformance with the 1969 Santa Ana River Judgment, a minimum of 17,000 AFY of water will be discharged to the Santa Ana River. This leaves more than 86,000 AFY of recycled water available for beneficial reuse within the IEUA service area by 2020.

IEUA's overall goal is to achieve maximum reuse of all available recycled water. In the short term, the primary focus of IEUA's recycled water program will be the connection of industrial and landscape customers and development of facilities to ensure cost-effective delivery of recycled water to groundwater recharge spreading sites. In the long term, IEUA seeks to construct a "looped" distribution system that will interconnect IEUA water reclamation plants, ensure direct supply reliability to customers and maximize the flexibility to recharge all surplus recycled water in flood control spreading grounds.

The current distribution system is comprised of two separate pipelines that have been constructed to serve IEUA's wastewater treatment plants. Recognizing that separate pumping stations, independent pressure zones, and multiple control interfaces will ultimately lead to overly complex and costly operations, the concept of a large, fully integrated (regional) distribution system was developed. As shown in Figure 5-1, the existing and proposed facilities will provide the ability to provide recycled water to major industrial and municipal users while delivering recycled water, storm water and imported water to groundwater recharge basins throughout IEUA's service area.

NEED FOR REGIONAL RECYCLED WATER DISTRIBUTION SYSTEM

- *More dependable local supplies*
- *Reduced imported water dependence*
- *Drought-proofing the Basin*
- *Reduce likelihood of water rationing*
- *Lower cost of water*
- *Lower sewer rates*
- *Provide economic incentives to attract new jobs and industry*

Recycled water used for groundwater recharge will be blended with MWD's imported SWP supplies and local storm water, consistent with the water quality requirements of the Chino Basin Watermaster's Optimum Basin Management Plan, Santa Ana Regional Water Quality Control Board's Basin Plan and the requirements of the State of California Department of Health Services (DHS) requirements.

Depending on modeling of aquifer retention time, the distance to the nearest well, and up-gradient groundwater migration data, the blending ratio will be calculated to achieve the 20% target set by DHS. Current estimates are that approximately 25,000 AFY of recycled water could be recharged at spreading grounds throughout the Chino Basin. Additional facilities, including the construction of new transmission lines for imported water from the MWD Rialto Pipeline, development of new groundwater recharge basins, and installation of additional pumping capacity, will be needed to achieve the long term water recycling goals for the region.

Development of local recycled water facilities will be the key to expanding the direct use of recycled water. Direct uses include irrigation for landscaping, industrial process and cooling, and recreational uses such as decorative fountains. As the recycled water facilities expand for the first time into cities such as Fontana, IEUA will be looking to the local water providers to construct sufficient recycled water facilities that will reduce their dependence on imported water from MWD's Rialto Feeder.

All future direct use (landscape and industrial customers) of recycled water will be given priority service over recharge deliveries. Recharge will be credited based upon the annual flow contributions for all contracting agencies on a pro-rata basis.

Table 5-6 and Table 5-7 provide projections for total regional recycled water usage between 2005 and 2025. Table 5-6 provides a projection for direct use of recycled water by sector of use. Table 3-13 provides a break down of projected supplies by retail agency.

Table 5-6
Projected Recycled Water Usage
All Values in Acre Feet

Category	2000	2005	2010	2015	2020	2025
Recharge	0	1000	22,000	25,000	28,000	35,000
Industrial	10	2,000	6,000	6,000	10,000	17,000
Municipal	3,440	4,400	31,000	40,000	45,000	49,000
Agricultural	150	1,000	2,000	3,000	3,000	3,000
Total	3,600	8,400	61,000	74,000	86,000	104,000

In order to deliver the ultimate demand for recycled water additional regional pipelines, reservoirs, booster stations, and land parcels will be required. As outlined in the 2005 Recycled Water Implementation Plan approximately \$332.4 million in capital improvements will be required. The full capital improvement program is shown in Table 5-1.

5.7 TECHNICAL AND ECONOMIC FEASIBILITY OF SERVING RECYCLED WATER

The technical and economic feasibility of serving recycled water depends upon the identification of end users in conjunction with the construction of additional distribution facilities, recharge basins, groundwater pump stations and desalters to provide water deliveries.

Capital funding needs for the Regional Recycled Water Distribution System are estimated at \$110 million over the next ten years. This includes grant funding from California's Proposition 13--Santa Ana River Watershed Funds (\$19 million awarded in 2000 for Phase I, additional funds will be sought for Phase II), California's Proposition 13—State Water Resources Control Board water recycling grant program (\$15-\$20 million, applications pending), and the U.S. Bureau of Reclamation Title XVI Grants (\$20 million for water recycling and \$50 million for construction of desalters, Congressional authorization pending).

As more supplemental funding becomes available, the recycled water infrastructure becomes more cost-effective to construct. IEUA staff evaluated the capital funding needs for the Recycled Water Distribution System and determined that it can be funded through the Regional Program without an additional increase in the Regional Capital Capacity Reimbursement Amount (connection fee). This provides a significant opportunity for local retail agencies to implement the OBMP (capital costs) without impacting IEUA's water and sewer rates and charges.

In fact, recycled water sales could potentially lower water and sewer rates by 20% to 30% with full implementation of the Regional Recycled Water System. Recycled water sales revenue, combined with the MWD Local Projects Program (LPP/LRP)

rebate, could generate sufficient revenue to offset projected water and sewer rate increases for the regional program.

Key Recycled Water Studies and Reports

- 1981 – *Metcalf & Eddie / L.D. King*
- 1991 – *J.M. Montgomery*
- 1995 – *Camp, Dresser, and McKee*
- 1996 – *Black & Veatch*
- 2000 – *Optimum Basin Management Plan*
- 2000 – *OBMP Program EIR*
- 2000 – *Peace Agreement*
- 2002 – *IEUA Wastewater Facilities Master Plan*
- 2002 – *IEUA Recycled Water Feasibility Study*
- 2005 – *IEUA Recycled Water Implementation Plan*

5.8 ENCOURAGING RECYCLED WATER USE

IEUA is organizing a regional program to encourage water reuse within its service area. The establishment of new supplemental funding sources through federal, state and regional programs now provides significant financial incentives for local agencies to develop and make use of recycled water. This will remove a significant obstacle to the implementation of recycling water projects and programs.

IEUA Actions

IEUA is working closely with its local retail agencies to develop a regional recycled water distribution program that will maximize water reuse for the entire IEUA service area. Staff of all the agencies meets monthly to coordinate the master planning of the recycled water system to ensure that optimal capital investments are prioritized and that all potential customers are contacted regarding connection to the recycled water system. IEUA is also working with local retail agencies to ensure that all new residential, commercial and industrial developments have dual plumbing so that recycled water (when available) can be used for outdoor irrigation and other non-potable water uses.

IEUA has modified its wholesale rate for recycled water in order to provide a powerful financial incentive to potential users that convert their systems to recycled water. The previous recycled rate was set at 80% of the cost of imported water. The new rate is set at 20% of the cost of imported water, or \$60 per acre-foot. The new rate was unanimously supported by IEUA's local retail agencies and has generated significant interest by potential customers in using recycled water.

In addition, IEUA has proposed the following incentives to encourage the use of recycled water. These include the following:

- A discount for Non-Reclaimable Water service users (to promote removal of salts from the groundwater basin);
- Shared costs for service connections, water meters, and signage;
- Loans to help finance local (non-regional) infrastructure and retrofit projects that contribute to use of recycled water;
- Technical assistance with engineering, regulatory and institutional issues and with preparation of funding applications;
- Guarantee of recycled water supply reliability, especially during droughts.

IEUA is working with local retail agencies to develop a marketing program for recycled water. A customer database is being developed to identify current and prospective recycled water users. This database will also track monthly recycled water use as well as the construction, over time, of the component parts of the Regional Recycled Water System.

5.9 RECYCLED WATER PRICE INCENTIVES

IEUA is developing an extensive Regional Recycled Water Program consisting of advanced wastewater treatment and recycled water distribution system. This system is described in detail in Chapter 5 and in Recycled Water Implementation Plan (IEUA July 2005).

As the agency responsible for treating and disposing of wastewater throughout most of the Chino Basin, IEUA maintains a special pipeline for industries which produce wastewater that cannot be treated with conventional technologies before being placed ultimately in the Santa Ana River or being used in IEUA Recycled Water Program. This pipeline is referred to as the Non-reclaimable Waste (NRW) Line. The NRW Line carries non-reclaimable wastewater to the Los Angeles County Sanitation Districts facilities in Whittier for treatment and disposal. Since industrial water use represents a significant potential recycled water demand in the IEUA service area, the industries discharging to the NRW system represent the majority of industries in the service area which use significant amounts of water for non-potable purposes. This makes these industrial customers ideal candidates for recycled water use and expansion.

- Industrial use of recycled water is approved by the California Department of Health Services and mandated by the California Water Code 13550.

- In order to encourage recycled water use among NRW Line users, IEUA has established several incentives:

Recycled Water Rate – IEUA's rate for recycled water delivered to a contracting agency is \$60 per acre foot. The retail water utilities which have established a recycled water rate are offering it at a 30 to 50% discount from their potable rate. The amount of discount depends on each agency's existing potable rate, existing potable infrastructure revenue needs and capital improvements needed to convey recycled water from IEUA's regional system to individual customers. In addition, IEUA currently offers a discount to NRW customers using recycled water of 25% of IEUA's recycled water rate. (\$45 per acre foot)

Reliability – Recycled water is a reliable resource not subject to droughts or imported water availability. Existing potable service also remains available as a backup to recycled water, improving reliability.

Mandatory Use – In May 2002, the Board adopted Ordinance No. 75 establishing incentives and mandating the use of recycled water. Under the provisions of Ordinance No. 75, which is consistent with the California Water Code (Sec 13550) and the State Water Resources Control Board guidelines, potential recycled water customers who do not use recycled water when it is available are subject to a 50% surcharge on their potable water rate.

Technical Assistance – IEUA provides technical assistance to prepare necessary engineering reports and coordinate DHS approval of recycled water use at each customer's site. IEUA has also retained experts in industrial water use and quality to assist customers in assessing operational needs associated with using recycled water.

Financial Assistance – Under the Regional Recycled Water policy adopted in September 2000, IEUA offers financing for capital improvements at customers facilities required to separate potable from non-potable water systems.

Increased NRW discount – NRW Line customers who use recycled water when available or agree to use when available will be eligible for the proposed NRW "pass through" rate. The NRW customer will otherwise pay the current NRW rates. Those NRW customers not using recycled water or not agreeing to use it will be retroactively credited the difference paid between the current rate and the "pass through" rate at the time they begin using recycled water, with the credit to first cover the cost of on-site retrofit and engineering report preparation.

5.10 FUNDING

Implementation of the Regional Recycled Water Program has been coordinated with the availability of state and federal funds to minimize use of regional capital funds. IEUA has adopted a Ten-Year Capital Improvement Plan (CIP) which has a budget that breaks out the federal, state and local funding for recycled water project over the next ten years. Local funding will be through the Regional Capital Fund, State grants and loans through DWR and the State Water Resources Control Board, and Federal grant funding through the US Bureau of Reclamation's Title XVI program.

Repayment of the various loans will occur through recycled water sales revenues.. These revenues consist of sales of recycled water (current IEUA wholesale rate of \$60 per AF). and through the MWD Local Resources Program (LRP). With certain contractual limitations, MWD provides a payment of \$154 for each acre foot of recycled water that is directly reused (not groundwater recharge) up to 13,500 AF cap.

RECYCLED WATER PROGRAM IS CONSISTENT WITH:

- *Chino Basin Watermaster OBMP/Peace Agreement*
- *Legislative Policy (Water Code Section 13550)*
- *State Water Plan (Bulletin 160-1998)*
- *California Water Resources Control Board*
- *CALFED Bay-Delta Program*
- *State of California Recycled Water Task Force Report*
- *Colorado River 4.4 Plan*
- *MWD's Integrated Water Resources Plan*
- *SAWPA's Integrated Watershed Plan*
- *Santa Ana Regional Water Quality Control Board Basin Plan*
- *United States Bureau Reclamation's Southern California Comprehensive Water Reclamation and Reuse Study*

CHAPTER 6

REGIONAL GROUNDWATER MANAGEMENT PROGRAMS

6.1 OVERVIEW

Groundwater storage and management within IEUA's service area is the foundation of the integrated water management strategy for the area. As described in Chapter 3, groundwater currently comprises about 62% of the current water supplies needed to meet urban water demand.

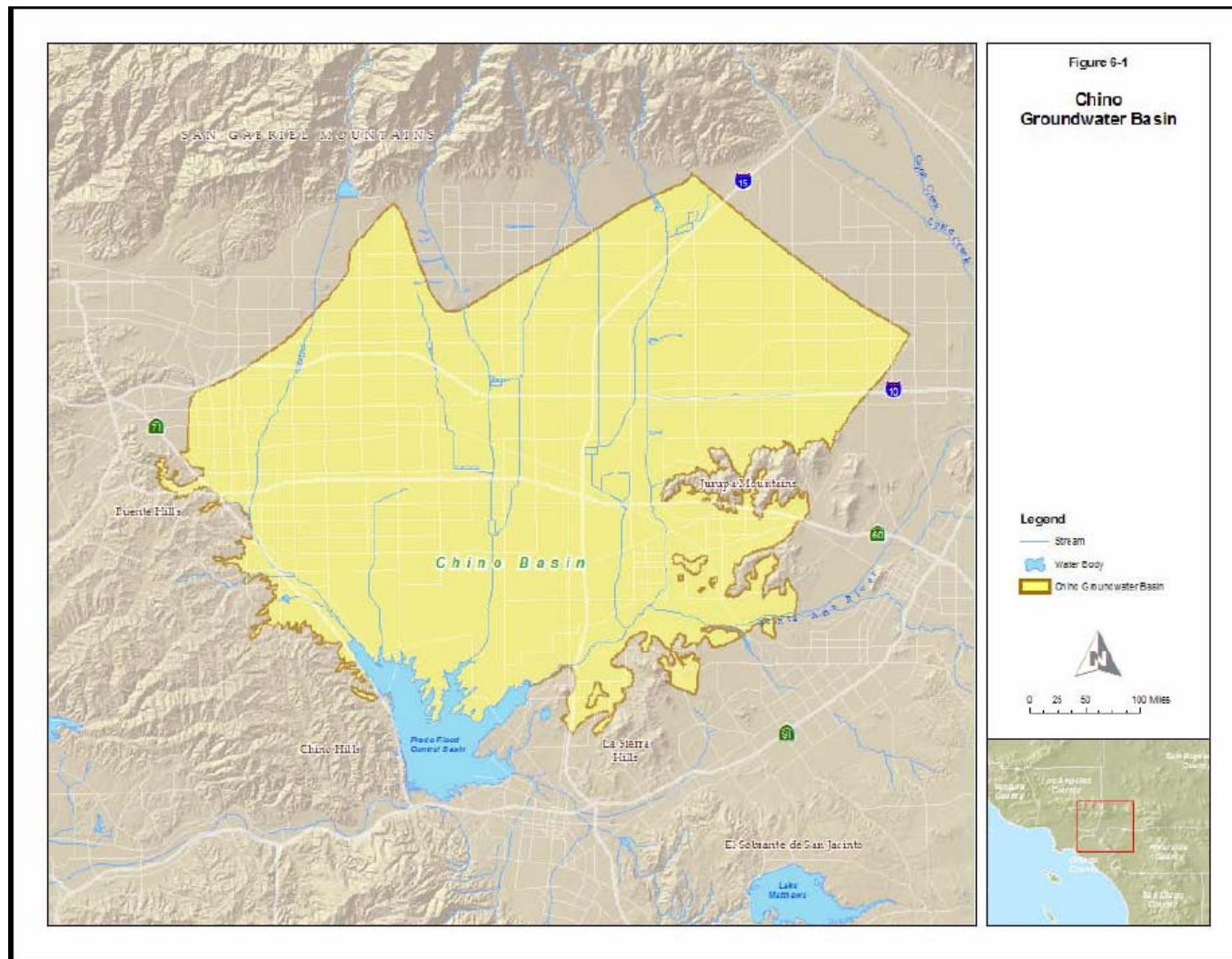
In the future, groundwater will increase in importance both as a core supply and a resource that can be tapped during dry years to meet the area's water needs. In collaboration with the Chino Basin Watermaster, agencies within IEUA's service area are implementing initiatives, including the Regional Groundwater Recharge Program, Chino Basin Desalter Program, and Dry Year Yield (DYY) Program, which will substantially increase the overall yield from the Chino Basin, especially during droughts, while improving the basin's water quality. By 2025, total urban groundwater production is expected to provide about 68 percent of the area's water during normal years, and 72 percent during dry years (see Chapter 10).

6.2 GROUNDWATER SOURCES

Chino Basin

The majority of the groundwater used within IEUA's service area is pumped from the Chino Groundwater Basin. Chino is the largest groundwater basin in the Upper Santa Ana Watershed. It currently contains approximately 5 million acre-feet (AF) of water in storage and has an additional unused storage capacity of approximately 1 million AF. Figure 6-1 shows the location and boundaries of the Chino Groundwater Basin.

Figure 6-1 Chino Groundwater Basin

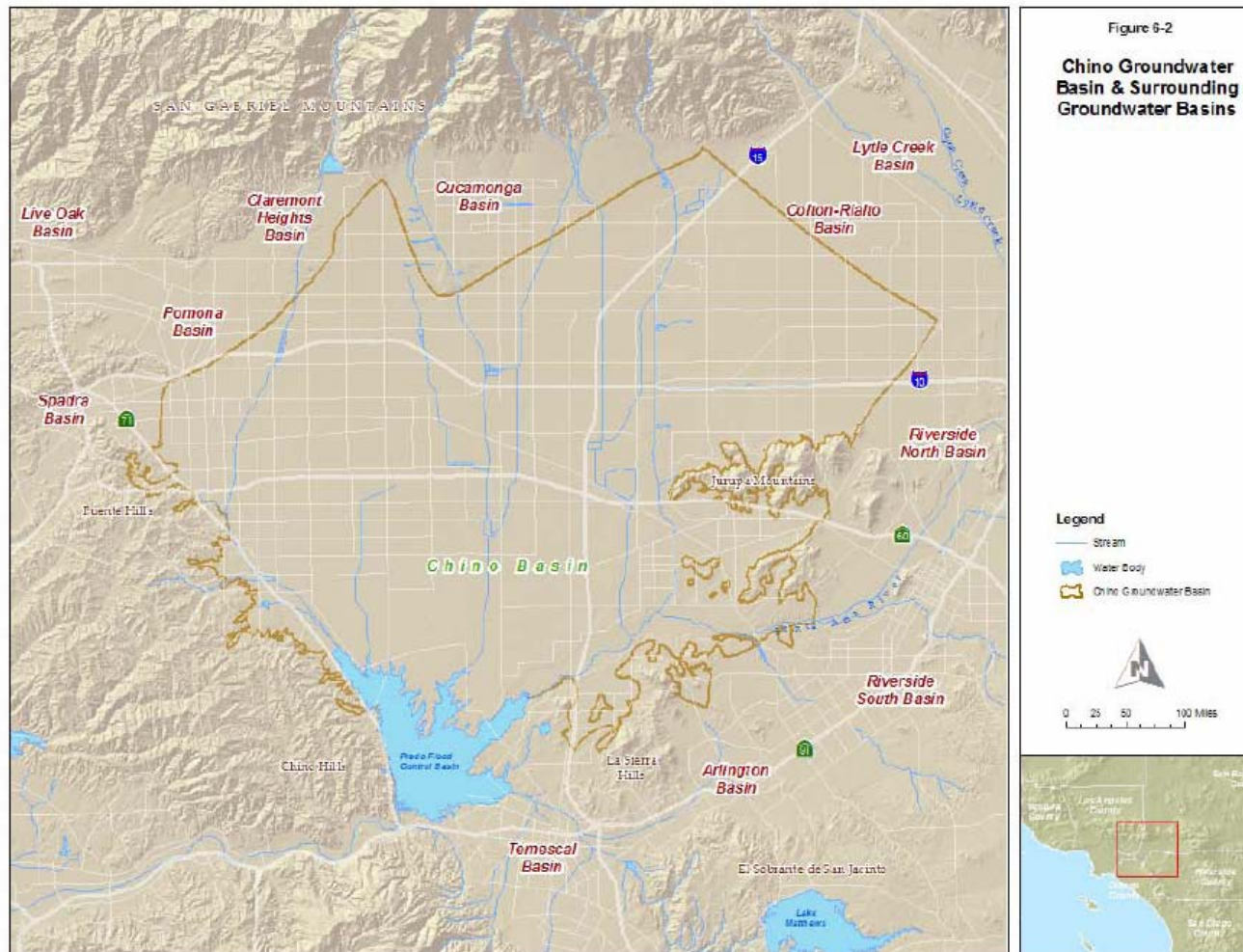


IEUA's service area covers about 70% of the Chino Groundwater Basin, as shown in Figure 1-2. (see Chapter 1) The water pumped to meet IEUA's service area urban water needs currently represents about 70 percent of the total production from this basin*. As described in Chapter 3, the service area's estimated total groundwater production from the Chino Basin, including water from the desalters, is about 133,600 acre feet per year in 2005. By 2025, the total urban production during normal years (with desalters) is expected to reach 212,900 acre-feet per year.

Other Groundwater Basins

Local groundwater supplies from basins other than the Chino Groundwater Basin represent a significant source of water for the retail water agencies within IEUA's service area, including the City of Upland, Cucamonga Valley Water District, Fontana Water Company, and San Antonio Water Company. These other basins include the Claremont Heights, Live Oak, Pomona, and Spadra Basins located in Los Angeles County, the Riverside South and Temescal Basins located in Riverside County; and the Colton-Rialto, Cucamonga, Lytle Creek, Bunker Hill, and Riverside North Basins located in San Bernardino County. Figure 6-2 shows the locations of the surrounding groundwater basins.

Figure 6-2
Chino Groundwater Basin and Surrounding Basins



As described in Chapter 3, the normal year production from these basins is currently 63,000 acre-feet of which about 33,000 acre-feet per year is used within the IEUA's service area. Over the next two decades, no significant changes are forecasted for the average amount of water supply produced from these basins.

6.3 DESCRIPTION OF THE CHINO GROUNDWATER BASIN

The Chino Basin covers about 235 square miles in the upper Santa Ana Watershed. A majority of the Basin (70%) lies within San Bernardino County. The rest of the basin overlaps into Riverside County (20%) and Los Angeles County (10%). The Chino Basin is bounded by Cucamonga Basin and the San Gabriel Mountains to the north, the Temescal Basin to the south, Chino Hills and Puente Hills to the Southwest, San Jose Hills, Pomona and Claremont Basin on the northwest and the Rialto/Colton Basins on the east.

The Chino Basin comprises an alluvial valley that is relatively flat from east to west and slopes from north to south at a 1-2% grade. Valley elevation ranges from about 2,000 feet in the foothills below the San Gabriel Mountains to about 500 feet near Prado Dam.

The geology and hydrology of the basin have been extensively studied. The principal drainage for the Basin is the Santa Ana River. While considered a single groundwater basin from geologic and legal perspectives, the Chino Basin has been hydrologically subdivided into five management zones with three sub-basins. The management zones are shown in Figure 6-3.

Figure 6-3
Chino Groundwater Basins with Management Zones

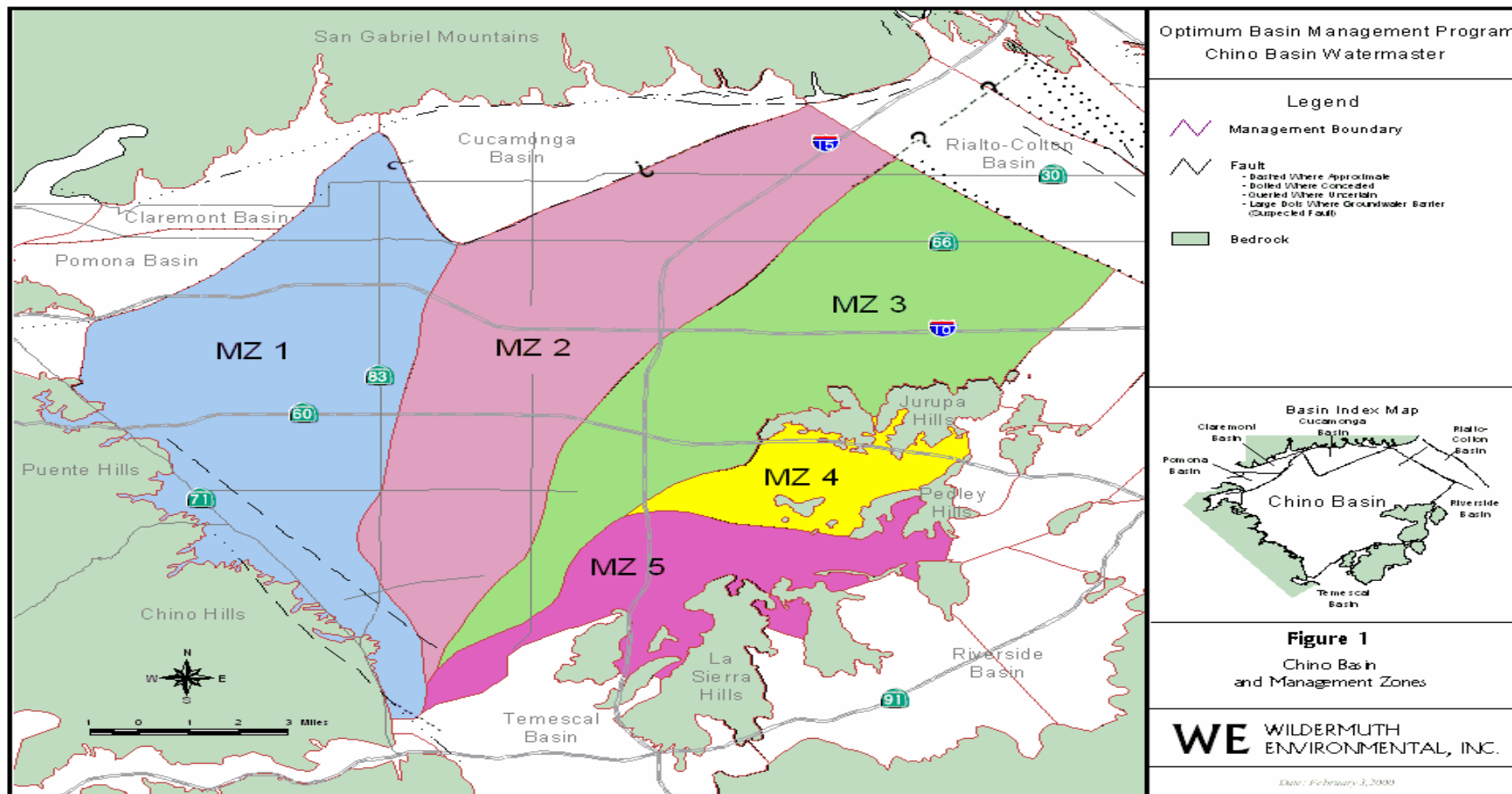
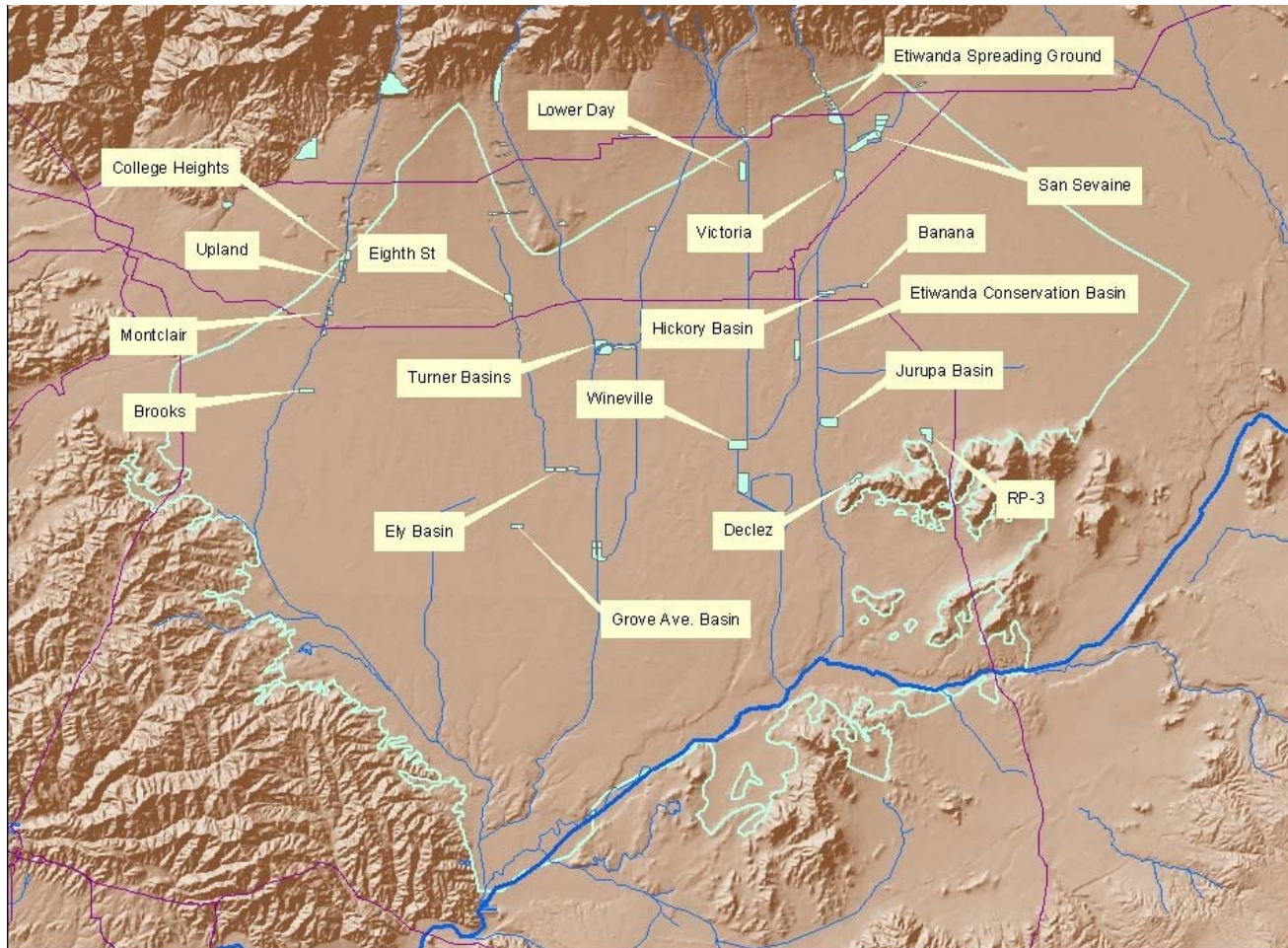


Figure 6-4
Chino Groundwater Basin with Priority Recharge Areas



6.4 MANAGEMENT OF THE CHINO GROUNDWATER BASIN

The Chino Basin Watermaster was established in 1978 by a Superior Court Judgment to administer the water rights for the Chino Groundwater Basin and address both water quality and other management issues. It is comprised of the major Chino Basin water users including cities, water districts, water companies, agricultural, commercial and private concerns.



Chino Basin Watermaster Mission:

“To Manage the Chino Groundwater Basin in the most beneficial manner and to equitably administer and enforce the provisions of the Chino Basin Watermaster Judgment”

Chino Basin Watermaster Appropriators:

Inland Empire Utilities Agency, and the Cities of Chino, Chino Hills, Norco, Pomona, and Upland, the Cucamonga Valley Water District, Jurupa Community Services District, Monte Vista Water District, and West Valley Water District, the Fontana Water Company, Fontana Union Water Company, Marygold Mutual Water Company, Monte Vista Irrigation Company, San Antonio Water Company, Santa Ana River Water Company, Southern California Water Company, and West End Consolidated Water Company, the Los Serranos Country Club, and San Bernardino County (Prado Shooting Park).

Water quality with the groundwater basin also degraded significantly during this time, further compromising the yield from the basin. Historic sources of contamination include conventional point sources, such as leaky underground storage tanks and discharges from industrial and wastewater sources, as well as non-point sources such as land application of fertilizers, infiltration from dairy and other agricultural operations and urban runoff (see Chapter 7).

The 1978 Chino Basin Judgement resulted in the adjudication of the water rights within the Chino Basin. The average safe-yield for the Basin is 145,000 acre-feet per year. This water is allocated among three “pools” of users: the Overlying Agriculture Pool which includes dairy farmers and the State of California (82,800 acre-feet/year), the Overlying Non-Agricultural Pool which includes industrial users (7,350 acre-feet/year) and the Appropriative Pool for urban uses which includes water for municipalities and other government agencies (54,834 acre-feet/year). Table 6-1 and 6-2 provides a breakdown of those entities holding

Chino Basin groundwater pumping rights for the Appropriative Pool and the Overlying Non-Agricultural Pool, respectively.

Table 6-1
Chino Groundwater Basin Appropriative Pool Rights¹

Party	Appropriative Right (AF)	Share of Initial Operating Safe Yield (AF)	Percentage Share Of Operating Safe Yield
City of Chino	5,794.6	4,034.14	7.36
City of Chino Hills	3,033.2	2,111.66	3.85
City of Norco	289.5	201.79	0.37
City of Ontario	16,337.4	11,373.67	20.74
City of Pomona	16,110.5	11,215.75	20.45
City of Upland	4,097.2	2,852.47	5.20
Cucamonga Valley Water District	5,199.2	3,619.59	6.60
Jurupa Community Services District	2,960.7	2,061.21	3.76
Monte Vista County Water District	6,928.8	4,823.75	8.80
West Valley Water District	925.5	644.30	1.18
Fontana Union Water Company	9,188.3	6,392.00	11.66
Fontana Water Company	0.0	1.97	0.000
Los Serranos Country Club	0.0	0.0	0.0
Marygold Mutual Water Company	941.3	655.27	1.20
Monte Vista Irrigation Company	972.1	676.65	1.23
Nicholson Trust		4.000	0.001
San Antonio Water Company	2,164.5	1,506.84	2.75
Santa Ana River Water Company	1,869.3	1,301.214	2.37
Southern California Water Company	590.7	411.26	0.750
West End Consolidated Water Company	1,361.3	947.53	1.73
San Bernardino County (Shooting Park)	0.0	0.0	0.0
Arrowhead Mountain Springs Water Co.	0.0	0.0	0.0
City of Fontana	0.0	0.0	0.0
Niagara Bottling Company	0.0	0.0	0.0
Total	78,764.10	54,835.03	100.000

¹Data from Chino Basin Watermaster 27th Annual Report (As of June 30, 2004)

Table 6-2
Chino Groundwater Basin Overlying Non-Agricultural Pool Rights

Party	Total Overlying Non-Ag Rights (AF)	Share of Safe Yield (Acre-Feet)
Ameron Steel Producers, Inc.	125	98.86
County of San Bernardino (Airport)	171	133.87
Vulcan Materials Company	406	317.84
CCG Ontario LLC	805	630.27
West Venture Development Co.	0	0
Southern California Edison Co	37	27.96
Reliant Energy, Etiwanda	1,219	954.54
Space Center, Mira Loma	133	104.12
Angelica Rental Service	24	18.79
Sunkist Growers, Inc.	2,393	1,873.40
Swan Lake Mobile Home Park	593	464.24
California Steel Industries	1,660	1,300
Praxair	546	427.45
General Electric Company	0	0
California Speedway	1,277	1,000
Loving Savior of the Hills Lutheran Church	0	0
Total	9,389	7,350.34

Source: Data from Chino Basin Watermaster 27th Annual Report (As of June 30, 2004)

Additional groundwater production (in excess of the safe yield) is permitted under the Judgment provided that the pumped water is replaced with replenishment water. In addition, groundwater is re-allocated to the Appropriative Pool for urban use from the Overlying Agricultural Pool when it is not pumped by the agricultural users. Over time, as agricultural production declines within the IEUA service area, the reallocation of groundwater to the Appropriative Pool is expected to increase (see Chapter 2, discussion of land use trends).

Management of the Chino Basin is now guided by the "Peace Agreement" of the Optimum Basin Management Program (OBMP) that was approved by the Chino Basin Watermaster and accepted by the Superior Court in 2000. The OBMP constitutes the integrated management plan for the Chino Basin. The goals of the OBMP are:

- **Enhance Basin Water Supplies.** This goal applies not only to local groundwater, but also to all sources of water available for the enhancement of the Chino Groundwater Basin including recharge of storm water runoff and recycled water, treatment and use of contaminated groundwater, reduction of groundwater outflow, and promotion of the direct use of recycled water

- **Protect and Enhance Water Quality.** This goal will be accomplished by implementing activities that capture and dispose of contaminated groundwater, treat contaminated groundwater for direct high-priority beneficial uses, and encourage better management of waste discharges that impact groundwater.
- **Enhance Management of the Basin.** This goal will be achieved by implementing activities that will lead to optimal management of the Chino Basin including optimization of local groundwater storage, development of conjunctive use programs, and encouragement of production patterns that optimize yield and beneficial use and development of alternative water supply sources that maximize availability of groundwater and minimize land subsidence; and,
- **Equitably Finance the OBMP.** This goal will establish an equitable financing plan that will spread the cost of OBMP implementation among the groundwater producers for each individual project required in the OBMP.

The OBMP has nine program elements as follows:

Program Element 1 – Develop and Implement Comprehensive Monitoring Program

The purpose is to increase the quantity and accuracy of information collected regarding surface and groundwater quality, groundwater levels, water use, land subsidence, and other pertinent parameters related to water resources in the basin. These monitoring data will be combined with historic data by the Chino Basin Watermaster for ongoing evaluation of basin conditions, assessment of the effectiveness of the various other components of the OBMP, and future update of the OBMP as appropriate.

Program Element 2 – Develop and Implement Comprehensive Recharge Program

The purpose of this program element is to create a comprehensive program to ensure that the locations of recharge basins (for stormwater and recycled water recharge) are effective enough to maximize groundwater production and decrease outflow to the Santa Ana River.

Program Element 3 – Develop and Implement Water Supply Plan for the Impaired Areas of the Basin

The purpose of this program element is to implement a basin-wide water supply plan which integrates the use of groundwater and imported supplemental water with continued pumping from the impaired areas of the basin. This includes the treatment (desalting) of degraded groundwater for future municipal water supply or other beneficial uses as appropriate.

Program Element 4 – Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1

The creation of a long-term groundwater management plan will address the continuing problem of subsidence and fissuring in Management Zone 1 so that it is reduced to tolerable levels or completely stopped.

Program Element 5 - Develop and Implement Regional Supplemental Water Program

This program element works to increase the use of stormwater, imported and recycled water (both directly and for groundwater recharge) to sustain, and potentially increase, the yield of the basin while maximizing the use of all available water resources in the basin.

Program Element 6 – Develop and Implement Cooperative Programs with the Regional Water Quality Control Board, Santa Ana Region (Regional Board) and Other Agencies to Improve Basin Management

Due to limited resources available to the Regional Board, the Chino Basin Watermaster will form a water quality committee to review water quality conditions in the Basin and develop (with the Regional Board staff) cooperative strategies and plans to improve water quality in the Basin.

Program Element 7 – Develop and Implement Salt Management Program

Salt management activities include developing a salt management assessment methodology. This methodology will be used to assess, in part, the ongoing effectiveness of the various OBMP components in improving and preserving groundwater quality for long-term beneficial use.

Program Element 8 – Develop and Implement Groundwater Storage Management Program

Storage management will address and protect space in the groundwater basin for storage by all the overlying interests in the basin.

Program Element 9 – Develop and Implement Conjunctive-Use Programs

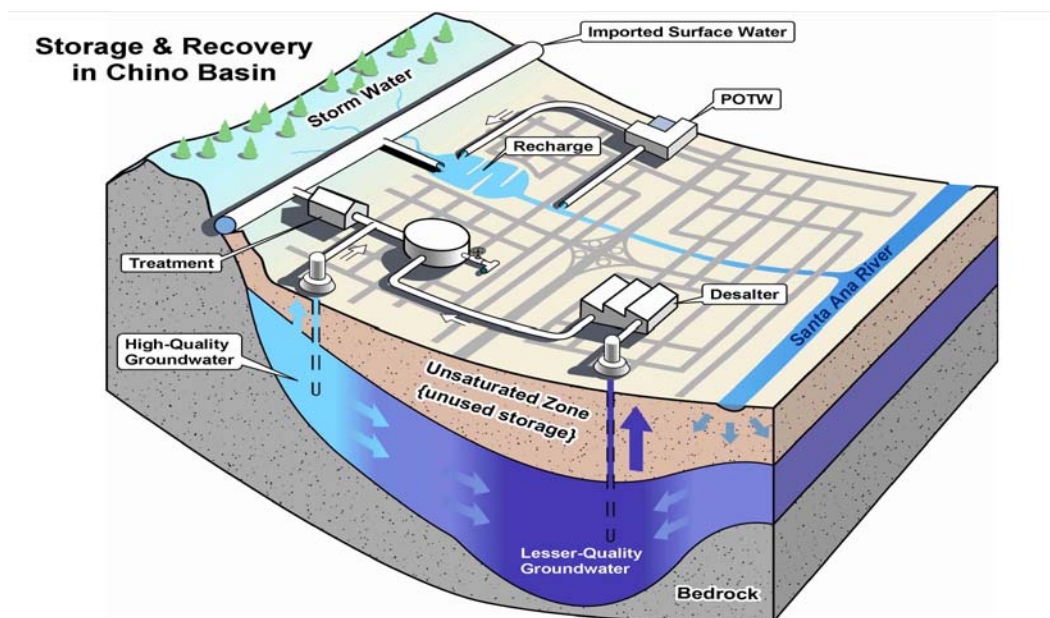
A conjunctive use program will provide opportunities for both in-basin and outside interests to utilize the large storage space in the groundwater basin toward maximizing local (in-basin) and regional water supplies.

A report on the status of the implementation of the Chino Basin OBMP, entitled “State of the Basin Report,” is provided every two years by the Chino Basin Watermaster (to view this report, please visit Chino Basin Watermaster on the web at www.cbwm.org).

6.5 CHINO BASIN GROUNDWATER STORAGE AND RECOVERY PROGRAMS

Since the Chino Basin Judgment was implemented in 1978, total groundwater storage in the Chino Basin has stabilized. Current groundwater production from the Chino Basin (total urban and agricultural production inside and outside the IEUA service area) is 182,000 acre-feet per year. By limiting annual water production to a safe yield level, but still allowing agencies to overpump as needed (provided replenishment water is later purchased and restored to the basin), the local agencies have alleviated overdraft concerns. Through improved management such as hydraulic control (Figure 6-5) of the groundwater basin, the Chino Basin Watermaster oversees a basin capable of storing 500,000 AF consistent with the PEIR for the OBMP (July 2000).

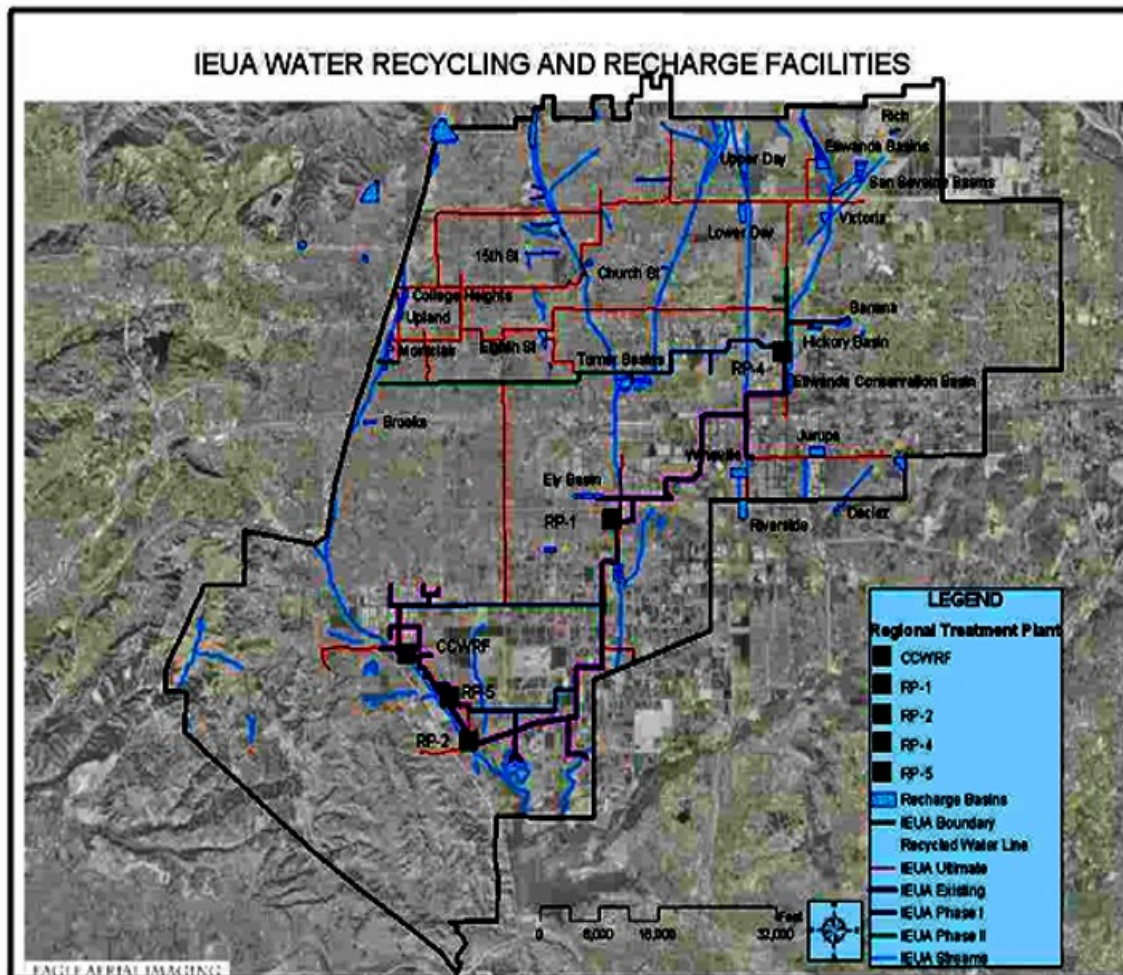
Figure 6-5
Storage and Recovery in the Chino Basin



Chino Basin Groundwater Recharge

To enhance groundwater storage, Chino Basin Watermaster has developed a Groundwater Recharge Master Plan (2001) that identified sources of recharge water and the improvements needed in recharge facilities to ensure capture and percolation of this water (Figure 6-6).

Figure 6-6
Locations of Chino Basin Recharge Facilities

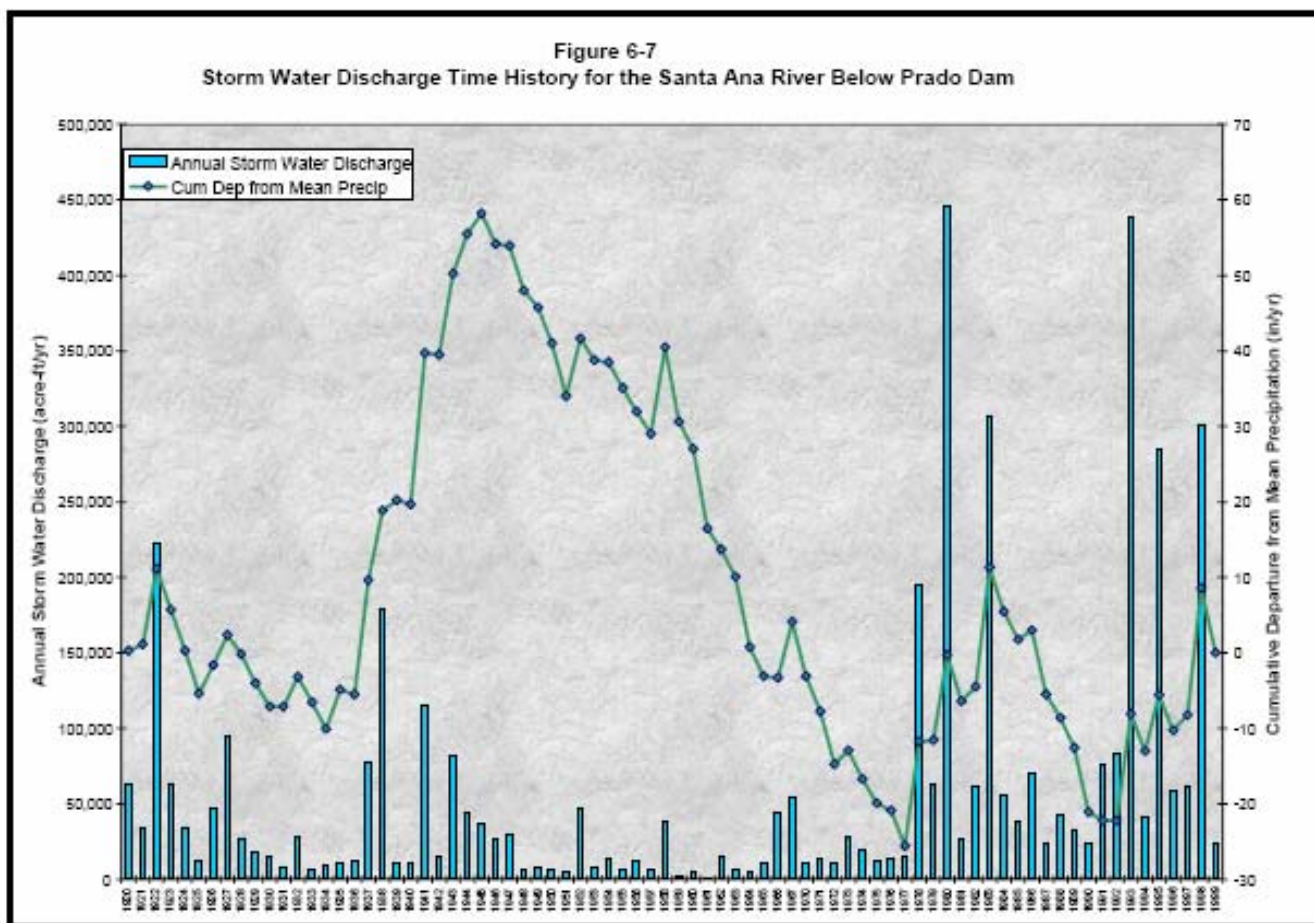


Studies conducted by the Chino Basin Watermaster identified the potential for increasing annual groundwater recharge capacity by over 100,000 AF per year from a combination of improved storm water capture, recycled water and imported water.

Capture of storm water has been identified as a top priority by the Chino Basin Watermaster. Increasing the yield of the Basin with this high quality source of water will improve groundwater quality and increase the assimilative capacity of the Basin. Studies indicate that, as a result of increasing urbanization and the construction of flood control facilities that expedite the conveyance of storm water

to the Santa Ana River, the Chino Basin is losing an average of 40,000 AF per year of the storm water that historically recharged the groundwater aquifer. The dramatic increase in runoff from the basin over time can be seen in Figure 6-7. Improvements to the flood control facilities plus modifications to the recharge basins could result in the capture of approximately 23,000 AF on average per year.

Figure 6-7
Chino Basin Storm Runoff



The second priority for recharge is the use of the high quality recycled water produced at IEUA's wastewater treatment facilities. Over 69,000 acre-feet of water is now available for local reuse projects (Table 5-2). IEUA, through its Regional Recycled Water Program, is constructing a regional distribution system that will make it possible deliver water to the groundwater basins for recharge (See Chapter 5 on Recycled Water). In 2005, the Santa Ana Regional Water Quality Control Board issued the permit for the use of recycled water for groundwater recharge. This is the first permit for indirect potable reuse in California that received unanimous local and statewide support.

The third priority for recharge is the use of imported water supplies. The Groundwater Recharge Master Plan identifies opportunities to use these supplies during wet years when surplus water is available.

In 2002, the Chino Basin Watermaster, Chino Basin Water Conservation District, San Bernardino County Flood Control District, and IEUA formed a partnership to implement the Chino Basin Groundwater Recharge Master Plan. Entitled the Chino Basin Recharge Facilities Improvement Project, this award-winning \$40 million construction program resulted in the modification of 18 existing recharge basins and the construction of two more facilities within IEUA's service area. Recharge basin improvements included the modification of inlet and outlet structures, placement of rubber dams to facilitate diversion of stormwater, earthwork to improve water percolation, and the construction of pump stations, conveyance facilities and turnouts from IEUA's Regional Recycled Water Distribution System and MWD's Foothill Feeder. The recharge facilities are ultimately expected to recharge 134,000 AF per year.

**Table 6-3
Chino Basin Potential Water Recharge Capacities**

Basin Name	Potential Basin Recharge Capacity			Total Potential Recharge Capacity	Percent Complete
	Storm	Imported	Recycled		
	Water	Water	Water		
Phase 1 Program Basins					
Banana Basin	800	3,400	1,000	5,200	100
Declez Basin	300	1,600	500	2,400	100
Hickory Basin	900	4,200	1,300	6,400	80
Jurupa Basin (Note 1)	0	0	0	0	90
RP-3 Basins	1,700	7,900	2,400	12,000	100
Turner Basin No. 1	900	1,300	500	2,700	100
Turner Basins Nos. 2, 3 & 4	1,800	3,800	1,400	7,000	100
Subtotal Phase 1 Basins:	6,400	22,200	7,100	35,700	N/A
Additional Program Basins					
7th & 8th Street Basins	1,600	2,600	1,100	5,300	100
Brooks Street Basin	1,900	0	5,000	6,900	100
College Heights Basins	100	7,900	0	8,000	98
Ely Basins	1,000	0	2,300	3,300	100
Lower Day Basin	500	3,700	1,000	5,200	100
Montclair Basins Nos. 1-4	2,100	9,900	0	12,000	----
San Sevine Nos. 1 through 3	1,700	7,700	2,300	11,700	----
San Sevine No. 4 & No. 5	500	6,800	1,800	9,100	----
Upland Basin	1,000	8,700	0	9,700	50
Victoria Basin	1,000	4,700	1,400	7,100	70
Subtotal Additional Program Basins:	11,400	52,000	14,900	78,300	N/A
Subtotal Constructed Basins:	17,800	74,200	22,000	114,000	
Future Basins (Note 2)					
Etiwanda Conservation Ponds (Note 2)	1,100	5,300	1,600	8,000	----
Etiwanda Spreading Basins (Note 2)	1,700	7,900	2,400	12,000	----
Subtotal Future Basins:	2,800	13,200	4,000	20,000	----
Total All Program Basins:	20,600	87,400	26,000	134,000	N/A

Source:

IEUA Facilities Management Plans Program EIR, Table 3-12. The recharge basin recharge capacities presented in the table represent the maximum values presented in Table 3-12.

Note 1:

The Jurupa Basin, through geotechnical testing, is believed to have minimal percolation benefits. As such, the Jurupa Basin will be used as a holding basin for water sources to be pumped to the RP-3 Basins for groundwater recharge.

Note 2:

Etiwanda Conservation Ponds and Etiwanda Spreading Basins were not developed because of Right of Way Issues. Values shown are estimates of recharge and are included in "Total All Program Basins" at the end of the table.

The Facilities Improvement project was completed in late 2005. However, sufficient work was completed by late 2004 that the recharge basins were able to capture over 16,000 acre-feet of new stormwater. This is water which, prior to the basin improvements, would have been lost to the ocean.

Consistent with the goals of the OBMP, additional recharge facilities may be developed by the Chino Basin Watermaster in the future. Regional implementation of stormwater Best Management Practices in new land developments will also improve recharge opportunities by encouraging local infiltration and reducing the amount of water lost from the groundwater basin. These practices will assist local communities in implementing the Stormwater Management Program Permit issued by the Santa Ana Regional Water Quality Control Board to San Bernardino County in 2005 and with future Total Maximum Daily Load (TMDL) requirements.

Groundwater production levels identified in Chapter 3 will require groundwater replenishment to sustain the groundwater supply. Replenishment requirement have been identified by the Chino Basin Watermaster and are summarized in Table 6-4 along with expected replenishment sources.

Table 6-4
Estimated Chino Basin Groundwater Replenishment Values, AFY

Source	2005	2010	2015	2020	2025
Stormwater	12,000	12,000	12,000	12,000	12,000
Recycled Water	1,000	22,000	25,000	28,000	35,000
Imported Water	45,300	57,600	54,400	54,900	60,100
Total	68,300	91,600	91,400	94,900	107,100

Hydraulic Control/Groundwater Desalination

As more water is recharged in the upper alluvial fans of the Chino Basin, groundwater production in the lower portion of the basin needs to be managed to ensure that Chino groundwater is not lost to the Santa Ana River and that poor quality water in the lower portion of the Chino Basin does not reach downstream basins. To retain hydraulic control, desalter facilities are being constructed and operated by the Chino Basin Desalter Authority at the down-gradient end of the Chino Basin, near the Santa Ana River. As described in Chapter 3, over 14,000 AF of desalted water is produced from the current facilities and additional desalter (Chino 2) capacity (10,000 AFY) will be brought on line in early 2006.

Chino Basin Watermaster, IEUA, Orange County Water District and the Santa Ana Regional Water Quality Control Board developed a hydraulic control monitoring program in 2005 to characterize the relationship of the Santa Ana River and the Chino Basin. Hydraulic control monitoring wells have been constructed and the monitoring program initiated. Information from this program will be use to adaptively manage the Chino Basin storage and recovery programs.

Chino Basin Maximum Benefit Plan/Basin Plan Amendment

To ensure that water quality within the groundwater basin is protected while storage and recovery of groundwater supplies increases, the Chino Basin Watermaster, IEUA and other water agencies have worked with the Santa Ana Regional Water Quality Control Board to develop an approved Maximum Benefit Plan. This plan specifies water quality objectives for the Chino Basin and the actions that will be taken to mitigate total dissolved solids (TDS) and nitrate loadings to the groundwater basin resulting from the augmented recharge program. This plan was adopted as a 2004 Basin Plan Amendment by the Regional Board and has been approved by the California Water Resources Control Board.

Groundwater Quality Programs

TDS Effluent Elimination – IEUA will limit the volume-weighted average TDS concentration in its effluent to less than or equal to 550 mg/L by using low TDS source water supply for potable uses, selective desalting of either source water and/or recycled water, and minimizing the TDS waste increment.

Salinity Management - IEUA and the Chino Basin producers will use best efforts to enact ordinances and development requirements that minimize the TDS waste increment (the average TDS increase that occurs through indoor uses and numerically equal to the average TDS concentration in recycled water minus the average TDS concentration in the source water supply).

TIN Effluent Elimination - IEUA will reduce the TIN (Total Inorganic Nitrogen) concentration in its recycled water such that it will produce a recycled water effluent with a 12-month average TIN of 8 mg/L or less.

Desalter Construction – Chino Basin Watermaster and IEUA will initiate planning for expansion of the Chino Basin desalting program called out in the OBMP in 2004 and have a plan completed and adopted by the Court in 2005.

Maintenance of Hydraulic Control – Chino Basin Watermaster and IEUA have proposed that the TDS and nitrate-nitrogen objectives in the Chino North management zone be established based on maximum benefit and not on antidegradation. One of the criteria required by the RWQCB that must be satisfied to establish objectives based on maximum benefit is to demonstrate that raising the TDS objective to 420 milligrams per liter (mg/L) and the nitrate-nitrogen objective to 5mg/L will not adversely impact the quality of the Santa Ana River or downstream beneficial uses. Demonstrating hydraulic control will show that downstream beneficial uses are not impaired by management activities in the Chino North management zone.

Conjunctive Use/Dry Year Yield

Conjunctive use describes the coordinated operation of surface water storage and use, groundwater storage and use, and conveyance facilities to meet water management objectives. There are three primary components to a conjunctive management program. The first is to recharge groundwater when surface water is available to increase groundwater in storage. This can be accomplished by reducing groundwater use and substituting it with surface water, allowing natural recharge to increase groundwater (often called in-lieu recharge) or by

augmenting recharge with supplemental supplies. The second component is to switch to groundwater use in dry years when surface water is scarce. The third component is to have an ongoing monitoring program to evaluate and allow water managers to respond to changes in groundwater, surface water or environmental conditions that could exceed management objectives or impact other water users.

The Chino Basin Watermaster is working in partnership with the Metropolitan Water District of Southern California (MWD) to develop regional conjunctive use programs that will store supplemental water for MWD and other agencies that have the capability of delivering surplus water for storage in the Chino Groundwater Basin. Under these programs, surplus water during wet periods would be banked and then withdrawn at a later time (either directly or through an in-lieu program). Under the OBMP, Watermaster has identified the potential to store and recover up to 500,000 acre feet in the Chino Basin.

In 2004, the Chino Basin Watermaster, Three Valleys Municipal Water District, and IEUA executed the Dry Year Yield Program (DYY) with MWD. The eight appropriators participating with MWD in the program are the Cities of Chino, Chino Hills, Ontario, Upland and Pomona and the Cucamonga Valley Water District, Monte Vista Water District, and Jurupa Community Services District.

The DYY Phase I will develop facilities to pump 33,000 AFY during a dry year utilizing the 100,000 AF storage account. The participants will be required to reduce (shift) their imported water usage by a predetermined amount during a dry year (see Table 6-5). Each participating agency has a specific shift obligation that, when added together, will provide Metropolitan with a total of 33,000 acre-feet of dry year yield.

**Table 6-5
Participating Agencies DYY Shift Obligations**

Local Retail Agency	DYY Program Shift Obligation (AFY)
City of Chino	1,159
City of Chino Hills	1,448
Cucamonga Valley Water District	11,353
Jurupa Community Services District ⁽¹⁾	2,000
Monte Vista Water District	3,963
City of Ontario	8,076
City of Pomona ⁽¹⁾	2,000
City of Upland	3,001
Total	33,000

Notes:

(1) Agencies not within the IEUA service area.

The DYY program will produce multiple benefits. This program will help meet Basin Plan water quality objectives by delivering State Water Project supplies to

the Chino Basin through the East Branch/Rialto Pipeline, minimize the need for MWD surface water deliveries during future droughts and emergencies and enhance the flexibility of MWD's operations. Facilities needed to support the DYY program include the construction of new wells and well head (ion exchange) water quality treatment. These facilities by contract are scheduled to be completed by 2008.

6.6 WATER TRANSFERS

Water transfers are a water management concept with great potential for helping to alleviate water shortages in our service area and the Santa Ana River Basin. The concept is that two agencies, one willing seller of water and one willing buyer, can enter into an exchange agreement that is mutually beneficial from a water management point of view. Water transfers allow an agency to "move" water from one service area to another, even when the two agencies are not connected by any pipelines.

The Chino Basin is expected to prove a valuable resource for water transfers because of its ability to be a storage facility for water. The Chino Basin has storage capability of up to 6 million acre feet.

As water management tool, water transfers can be quite effective during periods of severe drought or emergencies. Water transfers can take multiple forms to increase local reliability among agencies.

CHAPTER 7

ALTERNATIVE WATER SUPPLIES

7.1 OVERVIEW

Evaluating available alternative water supplies is part of a comprehensive water resources strategy that allows for long-term development and uses in the Chino Basin. The goal for alternative water supplies is to meet the region's water quality goals and provide IEUA's local retail agencies with a reliable and affordable water supply over the next twenty years. As discussed previously, a large program costing several hundred million dollars is currently being implemented to increase local groundwater storage, increase recycled water use and recover groundwater through advanced treatment (i.e. Chino Basin Desalters 1 and 2 and well head treatment). This chapter discusses possible new water supplies that may be implemented which would enhance local supply reliability and enhance water quality management of the Chino Basin.

Present Water Management Strategies

IEUA's water management goals are as follows:

- Implement an effective-innovative water conservation program that will maximize efficient water use and reuse in the service area by:
 - Water conservation with conversion to low-water-use dishwaters, toilets, shower heads and use of swimming pool covers, etc. Evaluate programs such as turf removal. These conservation efforts to achieve water savings of 28,500 AFY by 2010.
- Continue development of a groundwater recovery program by:
 - Pumping and treating plumes of contaminated water to a potable water quality and distribute the water for beneficial purposes
 - Continuing to implement brackish groundwater recovery of 24,000 AFY by 2010 by Desalters 1 and 2.
- Achieve maximum reuse of all available recycled water (104,000 AFY by 2025).
- Increase the safe storage capacity of the Chino Groundwater Basin by 100,000 acre-feet and implement a cooperative conjunctive use groundwater management program that provides dry year water supplies for the Chino Basin and parts of the Santa Ana River Watershed: (complete by 2008).
 - Expand and improve groundwater storage capabilities.
 - Develop new groundwater recharge basins
 - Injection & retrieval wells with wellhead treatment

- Achieve maximum capture, recharge, and use of all available stormwater;
 - Establish programs for total containment of on-site stormwater with pretreatment facilities at multiple sites, i.e., schools, parks, golf courses; parking lots, plus receive storm water from upgradient sites.
 - Research all available sites for new surface recharge basins.

All of the above concepts have been discussed in previous chapters and all help to minimize dependence upon imported water supplies. By emphasizing local water supply development within the service area, it is estimated that over 80,000 AFY of additional imported water can be saved through current programs by 2025.

Other programs under consideration, but not under development at this time include:

- Additional groundwater recovery projects, Desalter 2 expansion (10,000 AFY), and Desalter 3 (16,000 AFY)
- Expand water recycling beyond 104,000 AFY; (46,000 AFY).
- Additional groundwater replenishment through more efficient stormwater management (20,000 AFY); and
- Development of new water supplies such as gray water recovery, (10,000 AFY).

Through these additional programs, it is expected that local supplies can be expanded by an additional 1000,000 AFY.

7.2 GROUNDWATER RECOVERY

The projected ultimate development of the Chino Basin Desalter Program will produce 51,800 AFY of potable water; and extract an estimate 54,000 tons of salt from the Chino Basin annually. As a result, the program will clean up the area's groundwater while helping to meet the increased potable water demands in the lower Chino Basin.

Desalter No. 2 is presently under construction and is due to come on line in January 2006. The eight wells for Desalter No. 2 will pump 12 MGD of brackish groundwater and Desalter No. 2 will produce 10 MGD of potable product water for distribution but is expandable to 20 MGD. Table 7-1 lists the respective phases of the Chino Basin Desalter Program showing the ultimate development of the program. Eventually, the expanded program will recover 51,800 AFY of groundwater for potable use from the Chino Basin.¹

¹ Chino Basin Optimum Basin Management Program, State of the Basin Report 2004 (July 2005)

Table 7-1
Chino Basin Desalter Projected Expansion to Ultimate Production
AFY of Product Water

Desalter No.	Year Constructed	2005	2006*	2010	2015	2020	2025
Desalter* No. 1 & Expansion	2000	8,960	15,900	15,900	15,900	15,900	15,900
Desalter No. 2	2006		11,200	20000	20000	20,000	20000
Desalter No. 3	2010 – 2015			0	10,000	12,900	15,900
Total		8,960	27,100	35900	45900	48,800	51,800

*Denotes date of Desalter No. 1 expansion with the addition of ion exchange unit

Chino Desalter No. 3

As shown in Table 7-1, Chino Basin Desalter No. 3 (Desalter No. 3) is planned for future construction possibility in the years 2010 to 2015; initial capacity of this facility is 10,000 AFY with future expansion to 15,900 AFY. Desalter No. 3 might be an expansion of Desalter No. 2.

Wellhead Treatment of Impaired Groundwater

Some purveyor owned wells in the Chino Basin have been impacted by migration of contaminants to the level that the water from these wells can no longer be used for potable purposes. Under the MWD Dry Year Yield Conjunctive Use Program, impacted wells in the cities of Chino, Chino Hills, Ontario and Upland, plus, the special service districts of Cucamonga Valley Water District (CVWD), and Monte Vista Water District (MVWD) will have ion exchange wellhead treatment installed. These projects will improve yield and increase water quality in the groundwater basin especially during dry years. This program is in progress. Brine from the wellhead treatment processes will be transported ultimately to the Pacific Ocean via the NRW.

Pumping and Treatment of Plumes of Contaminated Water

In the Chino Basin, there are five identified plumes of contaminated groundwater from past industrial operations: the GE Flatiron Facility Plume, and GE Test Cell Facility Plume, the Ontario Airport VOC Plume; the Kaiser Steel Corporation Plume; the Milliken Landfill Plume, and the Chino Airport Plume. Pumping and treatment and treating of contaminated water from two of these plumes is underway; namely the GE Flatiron Facility Plume; and GE Test Cell Facility Plume.

The GE Flatiron Facility Plume and GE Test Cell Facility Plume are being treated using reverse osmosis. The treated water is then discharged to a local storm drain which flows to the Ely Basins 1, 2, & 3, where this water is recharged to the

Chino Basin aquifer. This treated water is of very high quality. The CBWM, IEUA and GE are studying the possibility of pumping this water into the IEUA Regional Recycled Water Distribution system for use by industries for cooling towers, and other industrial process. Public entitles could profit by using this water for schools, parks, park strips, etc.

The other plumes are being studied by the responsible parties as to how best to treat the contaminated water and possible reuses of the reclaimed product.

7.3 TAKING RECYCLED WATER TO THE NEXT LEVEL

Recycled water is a natural resource that has been overlooked in the past century of development in the Chino Basin. As an alternate water supply, the recycled water produced by the IEUA Recycled Water Reclamation Facilities is equivalent to most water supplies used for potable sources. As is discussed in Chapter 5, the Agency's recycled water meets all requirements for Title 22; permitting this valuable resources to be used for row crops, irrigation of parks and water features where human contact is likely; full human contact is permitted; but the recycled water is not allowed for potable uses. Beyond the current recycled water described in Chapter 5, the following recycled water applications are being contemplated.

Dual Plumbing

For the purpose of this subsection of this report, the referenced sections of the State CCR, Title 22 Requirements for Dual Plumbed Systems are defined in Sections: 60301.250. Dual plumbed systems, 60313; General requirements and operational requirements, 60316.

Section: 60301.250, provides the definition of "dual plumbed system" or "dual plumbed: as meeting a system that utilizes separate piping systems for recycled water and potable water within a facility and where the recycled water is used for either of the following purposes:

1. To serve plumbing outlets (i.e., in restrooms or water features) (excluding fire suppression systems) within a building, or
2. Outdoor landscape irrigation at individual residences.

Both applications are viable future uses of recycled water within IEUA.

Increased Use of Recycled Water for Groundwater Replenishment

Current planning for recycled water use in Chapter 5 calls for 35,000 AFY of recycled water replenishment. The 35,000 AFY value represents a maximum 20 percent blend of recycled water with stormwater and imported water. In the future, it is expected that future replenishment permits will allow a higher percentage level either because of successful operating experience at 20 percent level or through the use of additional treatment.

By 2025, it is expected that overall recycled water use will increase by 50,000 AFY.

7.4 EXPANDED GROUNDWATER STORAGE

The Chino Basin Watermaster was formed under the 1978 Judgment of the Superior Court of the State of California for the County of San Bernardino. Under the Judgment, the CBWM was charged to develop an Optimum Basin Management Plan (OBMP) that in future years would govern the operations of the groundwater basin.

Program Element No. 8 and 9 of the OBMP were to develop and implement a groundwater storage and conjunction use program. They have taken the form of the Dry Year Yield Program described earlier.

The CBWM, TVMWD and IEUA entered into an agreement with MWD for a “2003 Dry Year Conjunctive Use program” wherein MWD would store up to 100,000 acre-feet of imported water and be able to “call” for a 33,000 AFY reduction in imported water deliveries during a 12 month period. Recharge of the imported water will enhance the overall quality of groundwater stored in the Chino Basin aquifer. The Dry Year Yield (DYY) Program is scheduled to be operational in 2008.

The initial MWD program is expected to be the initial phase of a conjunctive use program that will increase to 500,000 AF of storage (reference CBWM Peace Agreement and IEUA PEIR, July 2000).

Expand and Improve Groundwater Recharge Facilities

The groundwater recharge program is always being enhanced and ever-expanding to meet the needs of the population of the Chino Basin. Several groundwater recharge basins in the Chino Basin complex will be expanded and improved beyond that of the Chino Basin Facilities Improvement Project (CBFIP). In the immediate future, improvements will be made to the present design, by adding hardened spillways to the internal berms; adding ridges and furrows to the flow-through basins to enhance the percolation rate; adding silt setting / debris catchments basins; and SCADA systems. Also, several new groundwater recharge basin sites are presently being evaluated and will have geophysical studies performed to determine their feasibility for future development.

Integration of San Antonio Dam in the Groundwater Management Project

Present practices by the U. S. Army Corps of Engineers (Corps) (who owns and operates the San Antonio Dam in conjunction with three water purveyors; Cucamonga Valley Water District, the San Antonio Water Company, and the City of Upland), is to capture and recharge water behind the San Antonio Dam into the Claremont Heights Groundwater Basin aquifer. During the exceptional rainy season of 2004-2005, water that could not be recharged to the Claremont Heights Basin was released from the dam into the San Antonio Channel, thereby

allowing it to flow to the Santa Ana River and downstream to Orange County. Due to the exceptional water year, a significant portion of this water flowed to the Pacific Ocean.

The CBFIP improved three sets of basins along the San Antonio Channel, namely the College Height Basins, the Upland Basin, the Montclair Basins 1, 2, 3, & 4, and the Brooks Basin. With better coordination in the future between the GRCC and the Corps, much of the water released from the San Antonio Dam can be captured and recharged in these newly improved basins. With the new SCADA system, continual monitoring of the channel flows and the water within the recharge basins, will allow for capture of excess flows in the channel thereby maximizing the recharge efforts in accord to with the OBMP.

Groundwater Extraction Enhancement with Monte Vista Water District

As is mentioned above in the Dry Year Yield Conjunctive Use Program, one of the limiting issues facing the Chino Basin Water Master and its entities is the region's ability to meet its drought proofing / groundwater recharge capacity goals within the Chino Groundwater Basin. The MVWD has implemented the Aquifer Storage and Recovery Program (ASR) using existing wells whose water quality has been impacted by high nitrates. MVWD has constructed two new ASR wells and modified several existing facilities, thereby enabling the MVWD to cost-effectively combine these groundwater management practices into a single coordinated operation. The injection & retrieval wells with wellhead treatment have the ability to provide up to 4,500 AFY of additional recharge capacity with MZ-1 (Management Zone 1) of the Chino Basin.

The project specifically targets nitrate contaminated groundwater for injection with high quality SWP supplies. The injection process provides for basin blending during low demand periods and for subsequent production during high demand periods without the need of treatment. By way of comparison, project-related groundwater modeling results indicate that this portion of the basin would not see water quality improvements through traditional surface recharge at existing and planned recharge basins located within MZ-1 of the Chino Basin until after 2020.

7.5 ENHANCED STORM WATER MANAGEMENT

As described in Chapter 6 previously, Program Element No. 2 of the OBMP was set forth to development and implement a comprehensive recharge program. A key part thereof is the establishment of a well coordinated storm water management program to capture the maximum amount of storm water. More efficient stormwater capture can be accomplished with the Chino Basin Facilities Improvement Project (described in Chapter 6) and enhancements to that project. In addition, there are a number of non-traditional stormwater management techniques that, if implemented, could significantly improve water management in the Chino Basin.

Principles for Stormwater Management

Stormwater runoff can be beneficially used to recharge groundwater systems and relieve pressure on stormwater infrastructure. Often perceived as a problem in the past due to the costs of controlling storm flows and pollutants; stormwater present an opportunity for groundwater recharge and other beneficial uses. The guiding principle of this approach is to initiate the containment and use of this valuable resource with management of each drop of precipitation as close to where it falls as is technically possible and economically feasible. This means examining the options available at the regional and local levels, i.e., parks; public and private golf courses; public and private schools; city and county streets and park strips; plus, public and privately owned buildings and their parking facilities; new subdivision developments and older neighborhood yards. Some of these measures include:

- Tree plantings. Studies have shown that tree foliage can hold and absorb up to 35% of the rain falling annually on the diameter of the tree canopy³.
- Turf management. Aeration and other techniques can increase the infiltration rate of lawns. When mowing lawns, leave higher turf as this helps to hold water on-site longer, allowing for more percolation and reduce evaporation during hot months. Certain grass species (by virtue of denser, deeper roots) can further improve infiltration.
- Roof Leader disconnects. Appropriate redirection of the leaders, re-grading of the landscape around a building, use of dry wells with perforated lateral piping (constructed infiltration chambers), and other techniques can infiltrate roof runoff and enhance subsurface irrigation of trees and shrubs, plus perennials .
- Cisterns. Some roof runoff can be captured in rain barrels or other cisterns. Stormwater captured in such a manner, can either be used for yard and garden watering, or released to dry wells or other infiltration systems once the storm passes.
- Surface infiltration basins. In some yards and many commercial landscapes, ponds, temporal “water gardens,” and other basins can be designed to gather site runoff and hold/infiltrate it over varying periods of time.
- Driveway and parking lot “cuts.” Modifying driveways to increase previous area can be done in many ways.
- Street narrowing. Common now in new developments, narrow streets calm traffic, increase green space, improve property values, and reduce imperious area. Some American communities are narrowing existing streets for the multiple benefits created. Portland, Oregon refers to their efforts as the “Skinny Streets” program.

- Parking lot redesign. Creative layout can incorporate “infiltration islands,” filter strips, and other storm water management features with no or little impact on the number of parking spaces.
- Porous pavements. The porous pavement techniques are well-developed and the performance well-tested. As streets and parking areas are repaved in coming decades, porous paving options should be given strong consideration.
- Major on-site storm water pretreatment & containment facilities. The major on-site storm water pretreatment and containment facilities could be sized to capture on-site flows and treat other runoff water from upgradient properties.
- Minor total containment with subsurface detention/infiltration chambers. Made of gravel or manufactured components, varying depths and capacities of chambers can be installed under lawns and parking lots to hold large volumes of site runoff during a storm and infiltrate that water to the subsoil in the following hours or days.

The IEUA Administration complex is an excellent example of on-site containment of stormwater. All stormwater falling onto the IEUA site is held on-site to enhance recharge to the aquifer. Schools, parks, and golf courses, plus numerous parking lots are excellent sites for better management of stormwater.

Chino Basin Green is a model home project that encourages environmental friendly design. It includes a example “design center” where home buyers can evaluate environmental friendly designs such as California friendly landscaping, drip irrigation, high efficiency heating, cooling and appliances, solar heating, and solar energy.

7.6 DUAL PLUMBING FOR GRAY WATER SYSETMS

An additional source of recycled water is the use of “gray water,” (household water from sinks, showers, bathtubs and clothes washing machines.

In addition to the standard sewer pipes that send wastewater (or black water) to the sewer collection and treatment system, a second set of plumbing pipes would direct cleaner water (gray water) from the washing machine, bathtub or shower onto the landscaping. Using the gray water would:

1. save water by reusing this water for irrigation;
2. conserve needed capacity in future Water Treatment Facilities;
3. conserve needed capacity in future Water Reclamation Facilities; and
4. cut back on water bills for outside irrigation.

Implementation of such a practice would need to be initiated in newly constructed homes and businesses. Estimated cost for dual plumbing in a new home would be from \$1,500 to \$2,000. Builders could offer the gray water system as an option.

The City of Phoenix Arizona is considering the gray water option. It is a matter of convincing the general public to use this source of recycled water. After considering the subject the City decided that gray water would cut down on the infrastructure needed for all water and wastewater systems.²

Estimated daily savings per household for gray water uses is presented in Table 7-2. Weekly savings would be 1,470 gallons, enough to irrigate shrubs and most present day lawns. Irrigation of vegetable and flower gardens are a real possibility after convincing the public to use this source of water.

Table 7-2
Gray Water Reuse for Landscape Irrigation (gallons per housing unit per day)
Without Conservation

Year	Showers	Bathtubs & Whirlpools	Bathroom Sinks	Kitchen Faucets	Clothes Washing Machines	Total Gray Water Available
2000	77.0	13.9	20.7	31.0	67.4	210.0
2005	76.2	13.7	20.5	30.7	67.7	208.8
2010	75.0	13.6	20.3	30.5	68.5	207.9
2015	75.7	13.6	20.3	30.4	69.8	209.8
2020	75.4	13.5	20.1	30.1	69.2	208.3

With Conservation

Year	Showers	Bathtubs & Whirlpools	Bathroom Sinks	Kitchen Faucets	Clothes Washing Machines	Total Gray Water Available
2000	70.0	13.9	20.1	30.1	67.3	201.4
2005	67.2	13.7	19.3	29.0	67.5	196.7
2010	65.4	13.6	18.8	28.1	68.4	194.3
2015	64.3	13.6	18.4	27.6	69.7	193.6
2020	63.1	13.5	18.0	27.0	69.1	190.7

Source MWD – Main Model, Section 5: End-Use Model Output – End Use Factors (2004)

² Arizona Republic Newspaper, May 30, 2005.

CHAPTER 8

WATER SHORTAGE CONTINGENCY PLAN

8.1 WATER SURPLUS AND DROUGHT MANAGEMENT PLAN

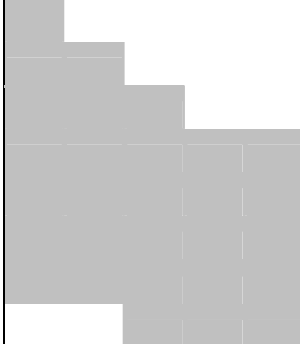
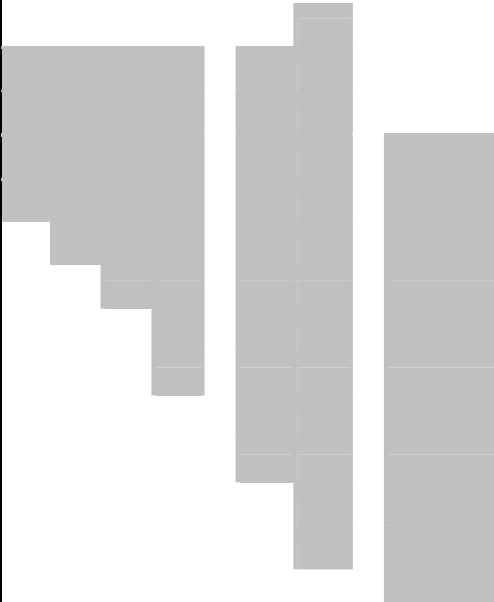
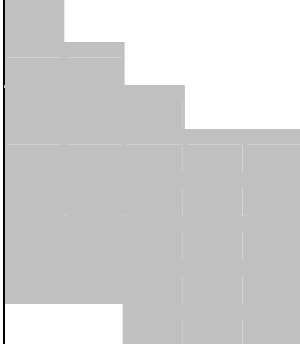
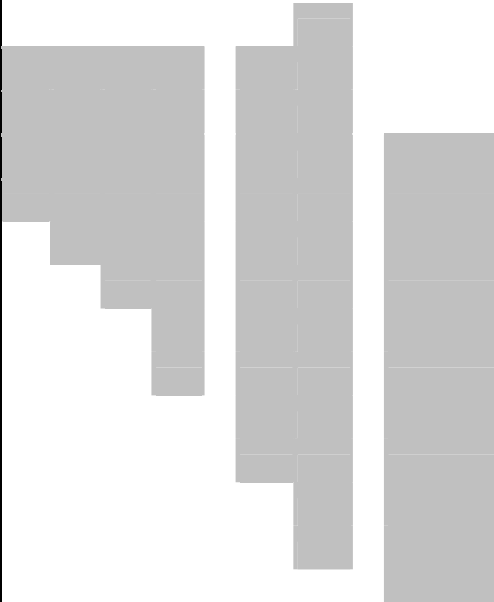
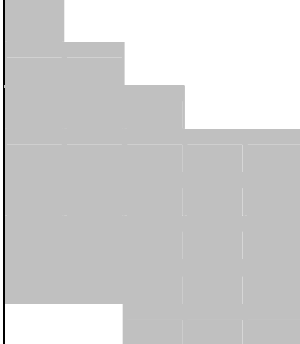
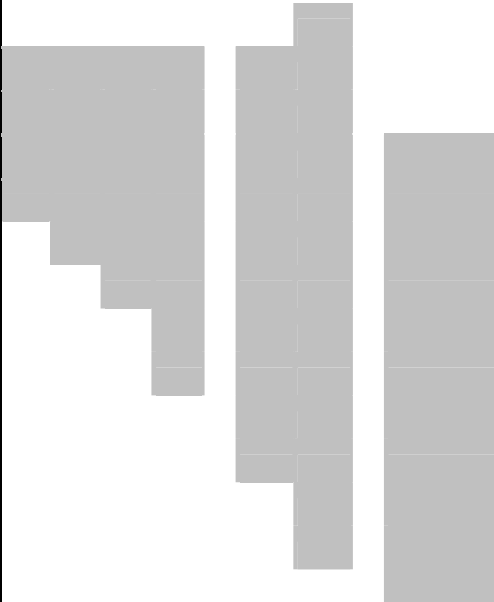
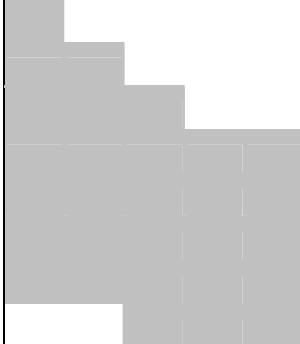
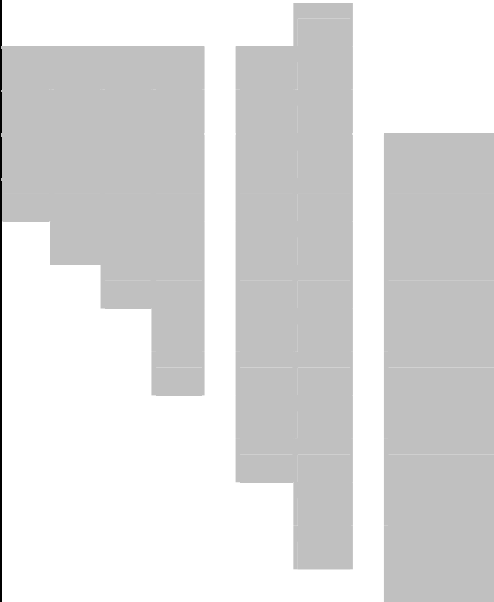
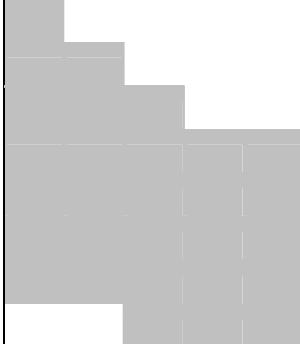
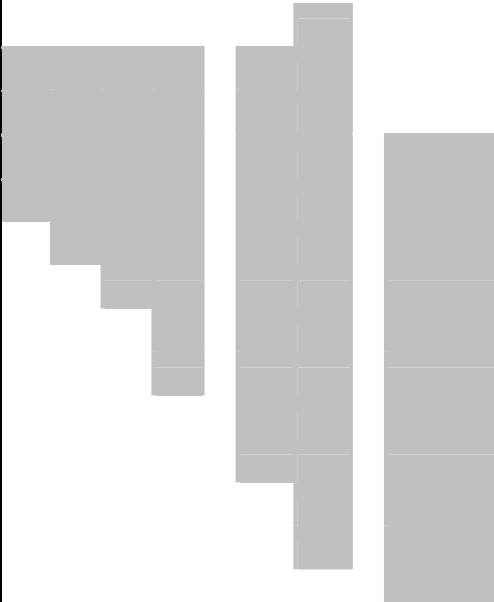
Metropolitan Water District (MWD) has taken the lead in drought planning for the southern California region. In 1998, MWD's Board of Directors adopted the Water Surplus and Drought Management (WSDM) Plan. This plan addresses both surplus and shortage operating strategies (reference MWD WSDM Plan, April, 1998). The WSDM plan reflects anticipated responses based on the water supplies available to Metropolitan.

Table 8-1 lists the definitions used in the WSDM Plan for surplus, shortage, severe shortage, and extreme shortage conditions. Except in severe or extreme shortages or emergencies, MWD's resource management will allow shortages to be mitigated without impacting municipal and industrial customers. Table 8-2 identifies the management actions MWD will implement under the WSDM plan. Table 8-3 identifies the actions that IEUA and the retail agencies will take locally.

Table 8-1
MWD "WSDM" Plan Definition

Surplus	Metropolitan can meet full-service and interruptible program demands, and it can deliver water to local and regional storage.
Shortage	Metropolitan can meet full-service demands and partially meet or fully meet interruptible demands, using stored water or water transfer as necessary.
Severe Shortage	Metropolitan can meet full-service demands only by using stored water, transfers, and possibly calling for extraordinary conservation. In a Severe Shortage, Metropolitan may have to curtail Interim Agricultural Water Program deliveries.
Extreme Shortage	Metropolitan must allocate available supply to full-service customers

**Table 8-2
MWD Water Surplus and Drought Management (WSDM) Plan**

Surplus Stage							Shortage Stages																		
Surplus							Shortage				Severe Shortage		Extreme Shortage												
5	4	3	2	1			1	2	3	4	5	6	7												
						Make Cyclic Deliveries																			
						Fill Semitropic, Arvin-Edison																			
						Store supplies in SWP Carryover																			
						Fill Contractual GW																			
						Fill Monterey Res.																			
						Fill Eastside																			
						Conduct Public Affairs Program																			
						Take from Eastside																			
						Take from Semitropic, Arvin-Ed																			
						Cut LTS and Replen. Deliveries																			
						Take from Contractual GW																			
						Take from Monterey Res.																			
						Call for Extraordinary Conservation																			
						Reduce IAWP Deliveries																			
						Call Options Contracts																			
						Buy Spot Water																			
						Implement Allocation Plan																			



Potential Simultaneous Actions

**Table 8-3
IEUA and Retail Agency Staged Actions**

Surplus Stage		Shortage Stages			
	IEUA & Retail Agency General Actions				
Surplus		Shortage			
		1	2	3	4
	Increase Imported Firm Deliveries Maximize Replenishment Activities				
	Conservation Programs Waterwise Public Information Campaign Maximize Stormwater Storage				
	Reduce Imported Water Replenishment Increase Groundwater Pumping General Water Use Restrictions in Effect* Landscape Irrigation Restrictions* Dust Control w/ Recycled Water Only Landscape Irrigation w/ Recycled Water Only* MWD Call on Dry Year Yield (DYY) Water Bill Surcharge/Fine* Potable Water Use Curtailments* Meter Flow Restricting Device*				

*Local agencies maintain their own water use restrictions and other actions in event of a drought declaration.

8.2 EMERGENCY DROUGHT ORDINANCES

Within IEUA's service area local retail agencies have adopted or are in the process of developing ordinances that address urban water shortage requirements. The drought planning provisions approved by each agency are described below in Section 8.2.

In 2004, IEUA performed an inventory of drought related ordinances that are currently part of the municipal code or administrative code of the cities and agencies in the IEUA service area. The results of the survey are summarized in Table 8-4. The ordinances will generally come into force upon a formal declaration of drought or water shortage conditions by one or more entities such as the DWR and MWD.

If a drought is declared, financial impacts to the local retail water agencies will vary from one agency to another. As a wholesale water agency, IEUA is simply a "pass-through" wholesaler so loss of revenue has no significant impacts except possibly the conservation programs which receive a portion of funding through a surcharge on each acre-foot of imported water sold.

The ordinances vary with different actions based upon the severity of the drought conditions. The definition of drought and water shortage stages used by Cities of

Chino, Chino Hills and Ontario and the Monte Vista Water District are presented in Table 8-5. Table 8-6 provides a summary of local agency drought ordinances, in the categories of prohibitions and restrictions, conservation actions, and the enforcement mechanisms available to each agency. The drought ordinances of each retail water agency are included in Appendix Q.

Table 8-4
Water Shortage Contingency Plan Check List by Agency

Emergency Drought or Water Shortage Ordinances	IEUA Member Agency							
	Chino	Chino Hills	MVWD	Ontario	CVWD	FWC	SAWC	Upland
Catastrophic Interruption Plan	√	√	√	√	√		√	√
Consumption Reduction Methods	√		√	√	√	√	√	√
Contingency Plan	√	√	√	√	√	√	√	√
Emergency Fund	√		√	√	√		√	√
Mandatory Prohibition	√	√	√	√	√	√		√
Ordinance/Resolution	√	√	√	√	√	√		√
Penalties	√		√	√	√	√		√
Rationing Allocation Method	√		√	√		√		√
Reduction Measuring Mechanism	√		√	√	√	√	√	√

**Table 8-5
Drought Stage Definitions by Agency**

Drought Stage	Agency			
	Chino	Chino Hills	MVWD	Ontario
1	Demand estimated to be $\leq 10\%$ in excess of available production of quality water	Total storage capacity reduced by 20-25%; not replenished within 48 hours	5-10% shortage of available water	Estimated shortage of up to 10% of water supplies
2	Demand estimated to be 10-15% in excess of available production of quality water	Total storage capacity reduced by 25-30% and not replenished within 48 hours	10-25% shortage of available water	Estimated shortage of 10-20% of water supplies
3	Demand estimated to be $\geq 15\%$ in excess of available production of quality water	no definition	25-40% shortage of available water	Estimated shortage of $>20\%$ of water supplies
4	no definition	no definition	$>40\%$ shortage of available water	no definition

MVWD = Monte Vista Water District

Note: Cities of Ontario and Upland, Fontana Water Company and San Antonio Water Company do not define Drought Stages

**Table 8-6
Local Agency Drought Ordinances**

	By Drought Stage as Defined in Table 8-5							
	Chino	Chino Hills	MVWD	Ontario	CVWD	FWC	SAWC	Upland
Prohibitions and Restrictions during Drought								
Conduct Public Hearings			1		X			X
Washing of vehicles without shut-off nozzle	1	1	1	1				X
Washing of sidewalks and all other hard surfaces		1	1	1				X
Water runoff into gutters from excessive or mismanaged irrigation	1	1	1	1			X	X
Non-recycling fountains/lakes/ponds restrictions		1	1	1				X
Unsolicited water service in eating/drinking establishments	1	1	1	1			X	X
Use of fire hydrants limited to fire fighting activities		1	3	3				X
Failure to repair leaks within 48-72 hours	1	1	1	1				X
New landscaping restrictions			2					
New turf/maximum allowable turf restrictions			2					
New pool or spa construction and/or filling restrictions		2	2					
Irrigation of golf courses and other water dependent industries restricted		2	1	2				X
Watering limited to prescribed times	1	1	1	1				X
Watering limited to prescribed days	2	2		2				
Additional dwelling construction prohibited			4					
Watering of turf or landscape by bucket only				3				
Ordinance Prescribed Conservation Actions								
Laundry facilities equipped with Energy Star washers/dryers								X
Pools/spas must be covered							X	
Flow restricting lavatory/kitchen faucets in all new construction						C		X
Low flush toilets and urinals installed in all new construction						C		X
Flow restricting shower heads installed in all new construction								X
Water conserving irrigation systems installed in all new public areas						C		
Water conserving fixtures installed upon change of property ownership								X
Landscaping irrigation with reclaimed water only			4					
Water use curtailments	1		2	2	X			
Incremental Rate Structure					X			
Enforcement								
Water bill surcharge/fine	√	√	√	√				√
Flow restricting device, locking or removal of meter, shutting off mainline	√	√	√	√	√		√	√
Prosecution		√						
Key:								
1 Stage 1								
2 Stage 2								
3 Stage 3								
4 Stage 4								
X No Defined Stage								
C Commercial Only								

Source: Telephone survey and review of city and water agency drought ordinances

8.3 PLANNING FOR A CATASTROPHE

Southern California's three imported water supplies (State Water Project, Colorado River Aqueduct and Los Angeles Aqueduct) cross the San Andreas Fault. Many other fault lines bisect major water facilities throughout the region. Experts consider it likely that one or more of these supplies will be disrupted in the event of a major earthquake.

MWD estimates that restoring service on any of these facilities following a catastrophic outage could take up to six months. This, in turn, could reduce annual deliveries by roughly up to 50% for MWD-supplied water. The UWMP requires agencies to consider the effect of a 50% cutback in water supplies. This corresponds approximately to the degree of cutback contemplated by MWD's earthquake disruption scenario.

In September 2005, IEUA adopted federal emergency response procedures called NIMS (National Incident Management System) which can be implemented by IEUA personnel for a localized event such as an accident at one of IEUA's facilities or on a broader based regional event such as an earthquake or flood. This system provides a consistent nationwide template to enable federal, state, and local governments (and local private sector and non-governmental organizations) to work together effectively and efficiently to prepare for, prevent, respond to, and recover from domestic incidents, regardless of cause, size, or complexity, including acts of terrorism. The NIMS procedures are expected to be fully implemented by June 2006. Complementary to NIMS, IEUA has completed Mutual Aid Agreements between itself and its local retail agencies (see Appendix R).

8.4 USE OF DRY YEAR YIELD DURING EMERGENCIES

In 2002, IEUA executed an agreement with the MWD to utilize the Chino Basin for dry year storage of up to 100,000 acre-feet of surplus imported water and new groundwater pumping capacity of 33,000 AF in a twelve month period. The DYY Program is described in Chapter 6. This stored water and more importantly these new groundwater production facilities and the Chino Desalters with their new water transmission lines, pumping plants and storage tanks increase significantly local supplies and reliability to meet shortages and emergency outages by individual agencies and with the interconnections between utilities allow for mutual supply arrangements.

8.5 EMERGENCY CURTAILMENT OF IMPORTED WATER

In June 2004, MWD conducted an unplanned shutdown of the Rialto Feeder pipeline. The pipeline was discovered to be in danger of collapse and repairs were needed immediately. Because the Rialto Feeder is the only source of significant imported water deliveries to the IEUA and the Three Valleys Municipal Water District (TVMWD) service areas, the loss of that supply during the summer when municipal and industrial water demand was high, could have had a devastating impact on local agencies. The Rialto

Pipeline Shutdown occurred from Monday, June 7, 2004 through Saturday, June 12, 2004.

To prepare their customers for the shutdown, the local agencies coordinated among themselves, MWD, and the local television and newspaper media. The TVMWD offices became the media center for press conferences and other addresses to the general public. Water agencies asked their largest customers to stop irrigating their landscapes and stop all non-essential water uses during the 5-day shutdown for repairs. Also, local agencies asked their residential customers to eliminate landscape irrigation and to reduce or eliminate their non-essential water use practices. Because each local agency has a different resource mix, each agency was affected somewhat differently by the shutdown. The Cucamonga Valley Water District (CVWD) seemed to be hit the hardest because they rely on imported water to supply 50 percent of their demand during that time of the year.

The CVWD Board of Directors determined that the best course of action was to declare a “state of water supply emergency” and issued an emergency shutdown notice to all their customers. CVWD customers responded well to the request by reducing overall water use by 60% during the week of repairs. This response easily allowed CVWD to meet all essential municipal and industrial demands as well as fire flow requirements. Other local agencies saw similar responses by their customers.

In the weeks following the shutdown MWD, IEUA and TVMWD issued a survey questionnaire to the affected water agencies asking for their assessment of the way MWD, IEUA, and TVMWD handled the shutdown (see Appendix S).

The responses to the survey showed, that overall, the lead agencies response to the shutdown and coordination with local media were reasonably successful. There was some confusion by commercial and residential properties owners on how to operate their irrigation controllers. As a result, a few landscapes remained watered during the first days of the shutdown. There was also some confusion by the public as to why several large landscapes in Chino and Ontario were being watered. As it turned out, these sites were using recycled water to irrigate. Ultimately, the irrigation was turned off to avoid further confusion.

Each of the agencies learned valuable lessons during this water emergency. Clearly, when the public is informed about the issue, water supply officials can expect a generally positive response from the public. The coordination with local agencies, the distribution of information, and conservation suggestions to the residents are the keys to maintaining credibility and confidence with the public.

CHAPTER 9

WATER QUALITY IMPACTS ON RELIABILITY

9.1 OVERVIEW

Planning efforts of IEUA and the Chino Basin Watermaster emphasize the importance of water quality. The region enjoys generally good water quality, but isolated areas of poor quality require that certain water sources be blended, or be treated to meet drinking water standards.

The percentage of urban water use by source within the IEUA service area during 2005 is shown in Table 9-1. About 32 percent of the urban water use in 2005 was MWD water, while 45 percent of the urban water use was from Chino Basin (including desalter water). IEUA distributes MWD water to the Cucamonga Valley Water District (CVWD) and the Water Facilities Authority (WFA) in our service area. The WFA serves five retail water agencies: the Cities of Chino, Chino Hills, Ontario, Upland and the Monte Vista Water District (MVWD). In 2005, about 92,400 acre-feet of Chino Basin groundwater was used for urban water supply, while an estimated additional 31,800 acre-feet of groundwater was used for agricultural irrigation. In order to reduce reliance on imported MWD water, significant increases in the use of ground, recycled and desalter water will be needed. The expansion of use of local supplies is expected to have a positive effect on water quality and an increased focus on water quality monitoring of local supplies. Water quality of existing and future water supply sources are discussed below.

Table 9-1
Current Percentage of Urban Water
Supplies within the IEUA Service Area

Water Source	Percent
Chino Basin Groundwater	43
Imported MWD water	32
Other basin groundwater	13
Surface Water	8
Desalter Water	2
Recycled Water	2

By year 2025, approximately half (50%) of the urban water supply is projected to be from Chino Basin groundwater wells. Thus, the discussion of water quality impacts on reliability presented in this chapter focuses primarily on water quality in the Chino Basin, although the water quality issues of the other water sources is also evaluated for impacts to reliability.

9.2 WATER QUALITY OF LOCAL SUPPLIES

Local water supplies include surface water from nearby mountain streams, recycled water from IEUA treatment plants, recovered groundwater from the Chino Basin Desalters, and groundwater extracted from the Chino Basin and other groundwater basins in the area.

Surface Water

Surface water from local sources that originate in the San Antonio Canyon, Cucamonga Canyon, Day Creek, Deer Creek, Lytle Creek and several other smaller surface streams is generally of high quality, as these creeks are feed by snowmelt and other precipitation in the San Gabriel Mountains. Nevertheless, surface water sources are treated prior to introduction to the potable water supply in order to insure bacteriological quality and compliance with state and federal drinking water quality standards.

Recycled Water

Recycled water holds the greatest potential as a new source of supply in the Chino Basin and in the southern California region as a whole; it also requires the highest level of treatment to meet Title 22¹ water recycling requirements. By the year 2025, direct recycled water use is projected at 69,000 AFY (24 percent of the IEUA water urban water supply) and another 35,000 AFY of recycled water will be used for groundwater replenishment.

All of IEUA water recycling treatment plants produce recycled water suitable for full body contact recreation and generally meet the more stringent aquatic habitat criteria. Due to salinity management (brine line) and the exclusive use of the SWP supply for imported water, TDS concentrations in recycled water remain relatively low for recycled water (typically 500 mg/l). Since recycled water is regulated and monitored carefully, water quality is expected to remain high.

Treated Groundwater

Treated groundwater from the Chino Desalters 1 and 2 is very high quality as a result of treatment by reverse osmosis (RO), ion exchange (IX) and air stripping. Raw groundwater from the Chino Basin is treated by the desalters, as it has high TDS and nitrates. TDS and nitrates are removed by the RO process and nitrate is removed by the IX process. Some of the groundwater wells for Desalter 1 have been impacted by a VOC plume located near the Chino Airport. In the future, other identified plumes (CIM plume and an Ontario Airport Plume) could impact desalter wells. VOCs are removed by an air stripping facility at Desalter 1. Areas within the Chino Basin with water quality concerns are discussed in Section 9.3.

Other Groundwater Basins

Limited information is available on water quality from the groundwater basins surrounding Chino Basin. Most of the surrounding groundwater basins have elevated concentrations of nitrate. Use of these local groundwater supplies by retail water agencies for potable water supply suggests that there are no significant water quality issues, or issues are solved by blending or well head treatment.

¹The State Department of Health Services requirements as specified in Title 17 and Title 22 of the California Health

Imported Water

MWD supplies about half the water used in southern California. Its' two main source of water are: 1) water from northern California as part of the State Water Project (SWP) delivered via the California Aqueduct, and 2) water from the Colorado River via the Colorado River Aqueduct (CRA). The total dissolved solids in Colorado River water average about 650 mg/l during normal water years. Water supplies from the SWP have significantly lower TDS levels than the Colorado River, averaging 320 mg/l during the past 20 years. IEUA only imports MWD water from the SWP in order to meet TDS objectives in Chino Basin. Other major water quality concerns include the following:

- Perchlorate in Colorado River and local groundwater supplies
- Disinfection by-products
- MTBE in groundwater and local surface reservoirs
- NDMA in groundwater and treated surface waters
- Hexavalent chromium in groundwater
- Radon and gross alpha

9.3 CHINO BASIN GROUNDWATER QUALITY²

For the most part, the groundwater quality in the northern and central portions of the Chino Basin is good and in most areas meets the California Department of Health Services' Safe Drinking Water Standards. The quality of groundwater in the southern portion of the basin becomes increasingly poor, with high total dissolved solids (TDS) and nitrate concentrations resulting from past and continuing agricultural uses overlying the southern half of the basin. In addition, new contaminants such as perchlorate have been discovered in the region and other contaminants such as TCE, PCE, DBCP and Chromium have been detected in groundwater extracted from Chino Basin.

The Santa Ana Regional Water Quality Control Board (SARWQCB) with the Chino Basin Watermaster, SAWPA and IEUA staff have developed water quality standards and management programs that will lead to the long-term clean up and management of the water quality issues in the Chino Basin. Treatment processes including desalination and the removal of brine are essential parts of the overall strategy to ensure maximum use of groundwater supplies.

Chino Basin groundwater is not only a crucial resource to overlying producers of water; it is a critical resource to the entire Santa Ana River Watershed. From a regulatory perspective, the use of Chino Basin groundwater to serve potable demands will be governed by drinking water standards, groundwater basin water quality objectives, and

² Chino Basin Optimum Basin Management Program, State of the Basin Report – 2004, July 2005

Santa Ana River water quality objectives. In August 1999, Phase I of the OBMP established a program for conducting groundwater quality and water level monitoring for the Chino Basin³ to assess the state of the basin.

Figure 9-1² shows all wells that have groundwater quality monitoring results for the period ranging from 1999 to 2004. The locations of existing and new desalter supply wells are also shown in Figure 9-1 for geographic reference.

Numerous water quality standards are in place and governed by Federal and State agencies. Primary “maximum contaminant levels” (MCL) are enforceable criteria established to improve human health and environmental effects. Secondary standards are related to aesthetic qualities of the water such as taste and odor. In addition, for some chemicals there are “notification level” criteria set by the state. These notification levels have been established to meet health concerns but are not enforceable. Table 3-2 (presented in Chapter 3) lists the constituents that exceeded at least one water quality criteria for more than 10 wells in the Chino Basin groundwater for the period January 1999 through June 2004. The main water quality issues for Chino Basin are: total dissolved solids, nitrates, perchlorate, radon and gross alpha radiation, chlorinated volatile organic compounds, and some elemental inorganic constituents.

Total Dissolved Solids

In Title 22, TDS is regulated as a secondary contaminant. The recommended drinking water maximum contaminant level (MCL) for TDS is 500 mg/l; however, the upper limit is 1,000 mg/l.

TDS concentrations in the northeast part of Chino Basin range from about 170 to about 300 mg/l for the pre-1980 period ranging with typical concentrations in the mid to low 200s⁴. TDS concentrations in excess of 200 mg/l would indicate degradation from overlying land use.

Figure 9-2 shows the distribution of TDS concentrations in Chino Basin for water well sampling from 1999 to 2004. Most of the basin has TDS concentrations in the range of 150 to 300 mg/l. Nevertheless, the southwest portion of the basin has elevated dissolved solids over 500 mg/l. With a few exceptions, areas with either significant irrigated land use or dairy waste disposal histories overlie groundwater with elevated TDS concentrations. The exceptions are areas where point sources have contributed to TDS degradation; for instance, the former Kaiser Steel site in Fontana and the former wastewater disposal ponds near the IEUA Regional Plant No. 1 (RP-1) in South Ontario.

Wastewater generally has higher dissolved solids than potable water (although Colorado River water has higher salinity than the IEUA water recycling supplies). Typically, each cycle of urban water use adds 250 to 400 mg/l of TDS to wastewater. Where

³ Wildermuth Environmental, Inc. 1999. Optimum Basin Management Program; Phase I Report. Prepared for the Chino Basin Watermaster, August 19, 1999.

⁴ Chino Basin Optimum Basin Management Program, State of the Basin Report - 2004

wastewater flows have high salinity levels, the use of recycled water may be limited or require more expensive treatment. Landscape irrigation and industrial reuse become problematic at TDS levels of over 1,000 mg/l.

The Chino Desalters were built in part to assist in water quality remediation of the salinity and nitrate contamination in the lower portion of the Chino Basin and protect the downstream water quality of the Santa Ana River.

Nitrate-Nitrogen

In Title 22, nitrate is regulated in drinking water with an MCL of 10 mg/L (as nitrogen). By convention, all nitrate values are reported in this document as nitrate-nitrogen ($\text{NO}_3\text{-N}$). Hence, the values of nitrate-nitrogen reported in this document should be compared with an MCL of 10 mg/l. Nitrate measurements in the surface water flows of the San Gabriel Mountains and in the groundwater near the foot of these mountains are generally less than 0.5 mg/l (Montgomery Watson, 1993). Nitrate concentrations in excess of 0.5 mg/L may indicate degradation from overlying land use.

Figure 9-3 shows the distribution of nitrate-nitrogen concentrations in Chino Basin for the period 1999 through 2004.

This sampling period primarily reflects data in the southern portion of Chino Basin. The results of comprehensive monitoring indicated that about eighty-three percent of the private wells had nitrate concentrations greater than the MCL and 60 percent are more than 2.5 times greater than the MCL. As with TDS, each consecutive sampling program saw a shift toward higher nitrate concentrations.

Most of the nitrate concentrations in the northern portions (north of the 60 freeway) of Chino North MZ are generally less than 5 mg/l. However, the Pomona-C Claremont area (up to 15 mg/l), the eastern Fontana area (up to 10 mg/l), and the Cucamonga Basin (up to 25 mg/l), all have elevated nitrate concentrations. The following areas, south of the 60 Freeway, have somewhat elevated nitrate concentrations; east of the Puente and Chino Hills, south of the Jurupa Hills, along the Santa Ana River, the Temescal and Riverside Basins, and down gradient of the former RP-1 discharge point. Several wells in the southern portion of Chino Basin have nitrate concentrations greater than the MCL and 21 wells exceed 40 mg/l (4 times the MCL).

Areas with either significant irrigated land use or dairy waste disposal histories overlie groundwater with elevated nitrate concentrations. The primary areas of nitrate degradation are the areas formerly or currently overlain by:

- Citrus in the northern parts of the Chino-North Management Zone (MZ) and,
- Dairy areas in the southern parts of the Chino-North MZ, the Chino-South MZ, the Chino-East MZ, and the Prado Basin MZ (PBMZ).

Nitrate concentrations in groundwater have increased slightly or remained relatively constant in the northern parts of the Chino-North MZ over the period ranging from 1960 to the present. These are areas formerly occupied by citrus groves and vineyards. Nitrate concentrations underlying these areas rarely exceed 20 mg/l (as nitrogen). Over the same period, nitrate concentrations have increased significantly in the southern parts of the Chino-North MZ, the Chino-South MZ, the Chino-East MZ, and the Prado Basin BMZ. These are areas where land use was progressively converted from irrigated/non-irrigated agricultural land to dairies, and nitrate concentrations typically exceed the 10 mg/l MCL and frequently exceed 20 mg/l.

Recycled water generally has a nitrate concentration in excess of 10 mg/l. Direct use of recycled water is for non-potable water uses, primarily irrigation and industrial use. A mixture of stormwater, imported and recycled water will be used to recharge Chino basin. By blending recycled water with stormwater and imported water, nitrate concentrations will be reduced.

Perchlorate

Perchlorate has been detected in wells in the Chino Basin, in other basins in California, and in other states in the West. The probable reason that perchlorate was not detected in groundwater until recently is that analytical methodologies did not previously exist that could attain a low enough detection limit. Prior to 1996, the method detection limit for perchlorate was 400 µg/l. By March 1997, an ion chromatographic method was developed with a detection limit of 1 µg/l and a reporting limit of 4 µg/l (parts per billion).

Perchlorate (ClO_4) originates as a contaminant in the environment from the solid salts of ammonium perchlorate (NH_4ClO_4), potassium perchlorate (KClO_4), or sodium perchlorate (NaClO_4). Perchlorate salts can be highly reactive. Ammonium perchlorate is used as a main component in solid rocket propellant and in some types of munitions and fireworks. Perchlorate salts are quite soluble in water. The perchlorate anion (ClO_4) is exceedingly mobile in soil and groundwater environments. Because of its resistance to react with other available constituents, it can persist for many decades under typical groundwater and surface water conditions.

The primary human health concern related to perchlorate is its interference with the thyroid glands ability to produce hormones required for normal growth and development. The California Department of Health Services (CDHS) had adopted a notification level of 6 µg/l for perchlorate and is in the process of developing a drinking water regulation. USEPA is also developing a drinking water standard for perchlorate.

Perchlorate was detected in 152 wells in the Chino Basin between January 1999 and June 2004. The results of perchlorate analysis of groundwater samples from the Chino Basin are shown in Figure 9-4. Perchlorate concentrations exceeding the State Action Level have occurred in the following areas of Chino Basin.

- There is a significant perchlorate plume in the Rialto-Colton Basin. The source of the plume is being investigated by the RWQCB and it appears to be located near

the Mid-Valley Sanitary Landfill. According to the RWQCB, other companies including B.F. Goodrich, Kwikset Locks, American Promotional Events Inc., and Denova Environmental Inc. operated nearby and used or produced perchlorate. These companies were located on a 160-acre parcel at T11N R5W S21 SW1/4. Denova Environmental also operated a 10-acre lot at T11N R5W S20 S1/2 (along the boundary between Sections 20 and 29). The perchlorate in the Fontana area of the Chino Basin may be a result of (1) the Rialto-Colton perchlorate plume migrating across the Rialto-Colton fault; (2) other point sources in Chino Basin; and (3) non-point application of Chilean nitrate fertilizer in citrus groves.

- Down gradient of the Stringfellow Superfund Site. Concentrations have exceeded 600,000 µg/l in on-site observation wells and the plume has likely reached Pedley Hills and may extend as far as Limonite Avenue.
- City of Pomona well field (source unknown).
- Wells in the City of Ontario water service area, south of the Ontario Airport (source(s) unknown).
- Scattered wells in the Monte Vista water service area (source(s) unknown).
- Scattered wells in the City of Chino water service area (source(s) unknown).

Several types of treatment systems designed to reduce perchlorate concentrations are operating in the United States, reducing perchlorate to below the 4 ppb, the quantitation level. Biological treatment and ion (anion) exchange systems are among the technologies that are being used, with additional treatment technologies development.⁵

Radon and Gross Alpha

Radon is a radioactive gas found in nature. It has no color, odor, or taste and is chemically inert. Higher concentrations of radon and gross alpha in groundwater typically occur near granite bedrock outcrops; one might expect to see higher occurrences of these constituents near the San Gabriel Mountains, Jurupa Hills, Puente Hills, and Chino Hills and along fault zones- Rialto-Colton Fault, San Jose Fault, and the Red Hill Fault. The geographic distributions of radon and gross alpha do not show the expected pattern however, there are no spatial patterns or outside evidence to suggest a source other than naturally-occurring. Based on water quality results from 1999 to the present, 58 wells in the basin are at or above the US EPA proposed MCL for radon. For gross alpha results, 165 wells are at or above the US EPA MCL.

VOCs

The following five volatile organic chemicals (VOCs) were detected at or above their MCL in more than 10 wells:

⁵ Ground Water & Drinking Water, Perchlorate, EPA www.epa.gov/safewater/ccl/perchlorate.html

- Tetrachloroethene (PCE) and Trichloroethene (TCE)
- 1,1-dichloroethene and *Cis*-1,2-dichloroethene;
- 1,2,3-trichloropropane'

Tetrachloroethene and Trichloroethene

Tetrachloroethene (PCE) and Trichloroethene (TCE) were and are widely used industrial solvents. PCE is commonly used in the dry-cleaning industry. About 80 percent of all dry cleaners use PCE as their primary cleaning agent (Oak Ridge National Laboratory, 1989). TCE is commonly used for metal degreasing and as a food extractant. In general, PCE is below detection limits for wells in the Chino Basin (Figure 9-5). The wells with detectable levels tend to occur in clusters such as those seen around Milliken Landfill, south and west of the Ontario Airport, and along the margins of the Chino Hills. The spatial distribution of TCE resembles that of PCE. TCE was not detectable in most of the wells in the basin, but similar clustering of wells with elevated TCE occurred around Milliken Landfill, south and southeast of Ontario Airport, south of the Intersection of Euclid Avenue and Holt Boulevard (from General Electric Flatiron facility), southwest of Chino Airport and in the Stringfellow plume as shown in Figure 9-5.

Dichloroethene and *cis*-1,2-Dichloroethene

Dichloroethene (1,1-DCE) and *cis*-1,2-dichloroethene (*cis*-1,2-DCE) are degradation by-products of PCE and TCE (Dragun, 1988) formed by the reductive dehalogenation, and their distribution as shown in Figure 9-6 and 9-7. In a majority of wells in the Chino Basin, dichloroethene and *cis*-1,2-dichloroethene were not detected. Dichloroethene is found near the Milliken Landfill, south and west of the Ontario Airport, south of Chino Airport and at the head of the Stringfellow plume; *cis*-1,2-dichloroethene was found in the same general locations.

1,2,3-Trichloropropane

1,2,3-Trichloropropane (1,2,3-TCP) is a colorless liquid that is used primarily as a chemical intermediate in the production of polysulfone liquid polymers and dichloropropene, synthesis of hexafluoropropylene, and as a cross linking agent in the synthesis of polysulfides. It has been used as a solvent, extractive agent, paint and varnish remover, cleaning and degreasing agent, and it has been formulated with dichloropropene in the manufacturing of soil fumigants, such as D-D.

The current California State Notification Level for 1,2,3-TCP is 0.005 micrograms per liter (µg/l). The adoption of the Unregulated Chemicals Monitoring Requirements (UCMR) regulations occurred before a method capable of achieving the required detection limit for reporting (DLR) was available. According to DHS, some utilities moved ahead with monitoring and the samples were analyzed using higher DLRs. Unfortunately, findings of non-detect with a DLR higher than 0.005 µg/l do not provide DHS with adequate information needed for possible standard setting. New methodologies to analyze for 1,2,3-TCP with a DLR of 0.005 µg/l have since been

developed and the DHS is requesting that any utility with 1,2,3-TCP findings of nondetect with reporting levels of 0.01 µg/l or higher do follow-up sampling using a DLR of 0.005 µg/l. Private wells monitored in 1999 through 2001 were analyzed for 1,2,3-TCP at a DLR of 50 µg/l. Because 1,2,3-TCP may be a basin-wide water quality issue, all private wells are being retested at a lower detection limit - 0.005 µg/l.

Aluminum, Arsenic, Fluoride, Iron and Manganese

The concentrations of aluminum, arsenic, iron, and manganese depend on mineral solubility, ion exchange reactions, surface complexations, and soluble ligands. These speciation and mineralization reactions, in turn, depend on pH, oxidation-reduction potential, and temperature.

Aluminum and Iron

In general, across the Chino Basin, aluminum and iron were below detection limits. However, both constituents were high in the Stringfellow plume. Outside of the Stringfellow plume, there were 18 wells with concentrations greater than the MCL. Aluminum concentrations exceeded the primary California MCL in 5 wells outside of the Stringfellow plume. Exceedances may be an artifact of sampling methodology – relatively high concentrations of aluminum, iron, and trace metals are often the result of dissolution of aluminosilicate particulate matter and colloids caused by the acid preservative in unfiltered samples.

Arsenic

The current arsenic MCL is 50 µg/l. In January 2001, EPA mandated that compliance with the new federal arsenic MCL of 10 µg/l would be required by 2006. After adopting 10 µg/l as the new standard for arsenic in drinking water, the US EPA decided to review the decision to ensure that the final standard was based on sound science and accurate estimates of costs and benefits. In October 2001, the US EPA decided to move forward with implementing the 10 µg/l standard for arsenic in drinking water (US EPA, 2001). Fourteen wells in the Chino Basin had arsenic concentrations that exceed the 2006 MCL. Only 4 wells in the basin exceeded the current MCL of 50 µg/l. Three of these wells belong to the City of Chino Hills, the remaining well is at the northern tip of the Stringfellow plume. Higher concentrations of arsenic in the Chino Hills area are found at depths greater than about 350 feet below ground surface.

Chino Hills 1A is a production well that is located about 30 feet from Chino Hills 1B, the well with the highest concentration of arsenic in the period from 1999 to 2004. During this period, samples from Chino Hills 1A (perforated interval: 166-217 ft. below ground surface) were below detection limit.

Fluoride

Fluoride occurs naturally in groundwater in concentrations ranging from less than 0.1 mg/l to 10-20 mg/l (Freeze and Cherry, 1979). However, site-specific monitoring wells may reveal point sources (e.g., wells near landfills have shown relatively high concentrations of manganese). Fluoride was detected in 954 wells within the basin, only 7 of which have concentrations that exceed the California primary MCL.

Manganese

Manganese is a naturally occurring element that is a component of over 100 minerals. Because of the natural release of manganese into the environment by the weathering of manganese-rich rocks and sediments, manganese occurs ubiquitously at low levels in soil, water, air, and food. Manganese compounds are used in a variety of products and applications including water and wastewater treatment, matches, dry-cell batteries, fireworks, fertilizer, varnish, livestock supplements, and as precursors for other manganese compounds. Manganese is often found near landfills especially when oxidation-reduction conditions promote its mobility in groundwater. Neither manganese nor any manganese compounds are regulated in drinking water. However, the US EPA has set a secondary standard MCL of 0.05 mg/l as has California. All these standards though are non-enforceable. Most of the wells sampled for manganese have resulted in non-detect. High concentrations of manganese in groundwater have been observed along the Santa Ana River in Reach 3, scattered throughout the southern portion of Chino Basin and near the Milliken Landfill.

Chloride and Sulfate

Chloride and sulfate both exceeded secondary MCLs. As discussed previously, secondary MCLs apply to chemicals in drinking water that adversely affect its aesthetic qualities and are not based on direct health effects associated with the chemical. Chloride and sulfate are major anions associated with TDS. Most wells in the basin had detectable levels of sulfate but most were less than 125 mg/l (one-half the water quality standard). A total of 83 wells had concentrations at or above the sulfate MCL of 250 mg/l. In general, these wells were distributed in the southern portion of the basin, along the margins of the Chino Hills and in the Stringfellow plume. All wells had detectable levels of chloride but most concentrations were less than 125 mg/l (one-half the MCL). The secondary MCL for chloride is exceeded in 68 well samples almost all of which are located in the southern portions of the basin.

Color, Odor and Turbidity

Color, odor and turbidity were detected at greater than their secondary MCLs in more than 10 wells in the last 5 years. These parameters are monitored purely for aesthetic reasons and should not limit water quality in Chino Basin.

9.4 CHINO BASIN AREAS OF CONCERN

The previous water quality discussion broadly described water quality conditions across the entire basin. The discussion presented below describes the water quality anomalies associated with known point source discharges to groundwater.

Figure 9-8 shows the extent of VOC plumes from likely sources including the Chino Airport, the California Institute for Men, General Electric Flatiron Facility, General Electric Test Cell Facility, the Milliken and Mid-valley Landfills, VOC Anomaly – South of the Ontario Airport and the approximate location of plumes from Kaiser Steel

Corporation and Stringfellow superfund site. The State of the Basin Report - 2005⁶ presents a description of these plumes and their probable sources.

9.5 IMPORTED WATER QUALITY

The results of all of Metropolitan's recent planning activities, have emphasized the central importance of water quality. In addition to the usual health considerations, water

quality has near-term supply quantity implications. For example, high dissolved solids (TDS) in water supplies lead to high TDS in wastewater, which lowers the usefulness of recycled water and increases its cost.

Salinity

Within MWD service area, local water sources account for about half of the salt loading, while imported water accounts for about half. All water sources need to be managed appropriately to sustain water quality and supply reliability goals. Due to salinity concerns, only imported water from the SWP is used in IEUA's service area. Water supplies from the SWP have significantly lower TDS concentrations than the Colorado River, averaging 250 mg/l. Nevertheless, the supply and TDS levels of SWP water can vary significantly in response to hydrologic conditions in the Sacramento-San Joaquin watersheds.

TDS levels of SWP water can also vary widely over short periods of time due to seasonal and tidal flow patterns in bay delta. For example during the 1977 drought, the TDS of SWP reaching MWD increased to 430 mg/l and supplies became limited. Unless salinity of source supplies can be reduced, it may not always be possible to maintain both salinity standards and water supply reliability.

Metropolitan's Board approved a Salinity Management Policy in April 1999. The goal of this policy was to achieve delivered water with less than 500 mg/l of TDS. At the same time, the Board adopted an Action Plan consisting of the following four components:

1. Imported water source control and salinity reduction actions,
2. Distribution system salinity management actions,
3. Collaborative actions with other agencies, and
4. Local salinity management actions to protect groundwater and recycled supplies.

⁶ Chino Basin Optimum Basing Management Program, State of the Basin Report – 2004, Section 4.4.3.4

Other Water Quality Issues

In addition to general concerns over TDS levels, health issues have been raised over particular pollutants in drinking water. For the region's supplies, the major concern have been associated with the following:

- Perchlorate in Colorado River and local groundwater supplies
- Disinfection by-products formed by disinfectants reacting with bromide and total organic carbon (TOC) in SWP water
- Methyl tertiary butyl ether (MTBE) in groundwater and local surface reservoirs
- Arsenic
- N-nitrosodimethylamine (NDMA) in groundwater and treated surface waters
- Hexavalent chromium in groundwater, and
- radon

In addition to monitoring for and controlling specific identified chemicals in the water supply, MWD has undertaken a number of programs to protect the quality of its water supplies.

Source Water Protection

Source water protection is important for all of California. The California Department of Health Services requires large utilities delivering surface water to complete a Watershed Sanitary Survey every five years to examine possible sources of drinking water contamination. The survey includes suggestions for how to protect water quality at the source. Metropolitan completed its most recent sanitary surveys in 2001.

A similar requirement from EPA calls for utilities to complete a Source Water Assessment. Information collected in the sanitary surveys is used to evaluate the vulnerability of water sources to contamination and to help determine the need for additional protective measures. Metropolitan completed its source water assessment in December 2002. Water from the Colorado River is considered to be most vulnerable to contamination by recreation, urban stormwater runoff, increasing urbanization in the watershed, wastewater and past industrial practices. Water supplies from northern California are most vulnerable to urban/storm-water runoff, wildlife, agriculture, recreation and wastewater.

Support SWP Water Quality Programs

Metropolitan supports DWR policies and programs that are aimed at maintaining or improving the quality of SWP water delivered to Metropolitan. In particular, Metropolitan supported the Department of Water Resources (DWR) policy to govern the quality of non-project water conveyed by the California Aqueduct, and it continued funding DWR's Municipal Water Quality Investigations Program that monitors and studies conditions affecting the quality of water in the Bay-Delta system.

Metropolitan also supports the Sacramento River Watershed Program, which was founded in 1996 to encourage interest groups to work together to address water quality problems in the watershed. Metropolitan provides funds to the program to help finance public service announcements to educate the public about the need to protect water quality in the watershed. Metropolitan also provides input to the development and implementation of the water quality monitoring in the watershed.

Water Quality Exchanges

Metropolitan has developed and fostered water quality exchange partnerships with the Friant Water Users Authority and the Kings River Water Association. Under these partnerships, Metropolitan will invest in local infrastructure in the partners' service areas, which will provide the physical capability for the partners to exchange high-quality Sierra water supplies for a portion of Metropolitan's SWP supplies.

In addition, Metropolitan has implemented selective withdrawals from the Arvin-Edison storage program and the Kern Water Bank to improve water quality. Although these programs were initially undertaken to provide dry-year supply reliability, they can also be used to store SWP water at periods of higher water quality, with the water available to withdraw and dilute SWP water deliveries at times of lower water quality.

9.6 SUMMARY OF WATER QUALITY IMPACTS

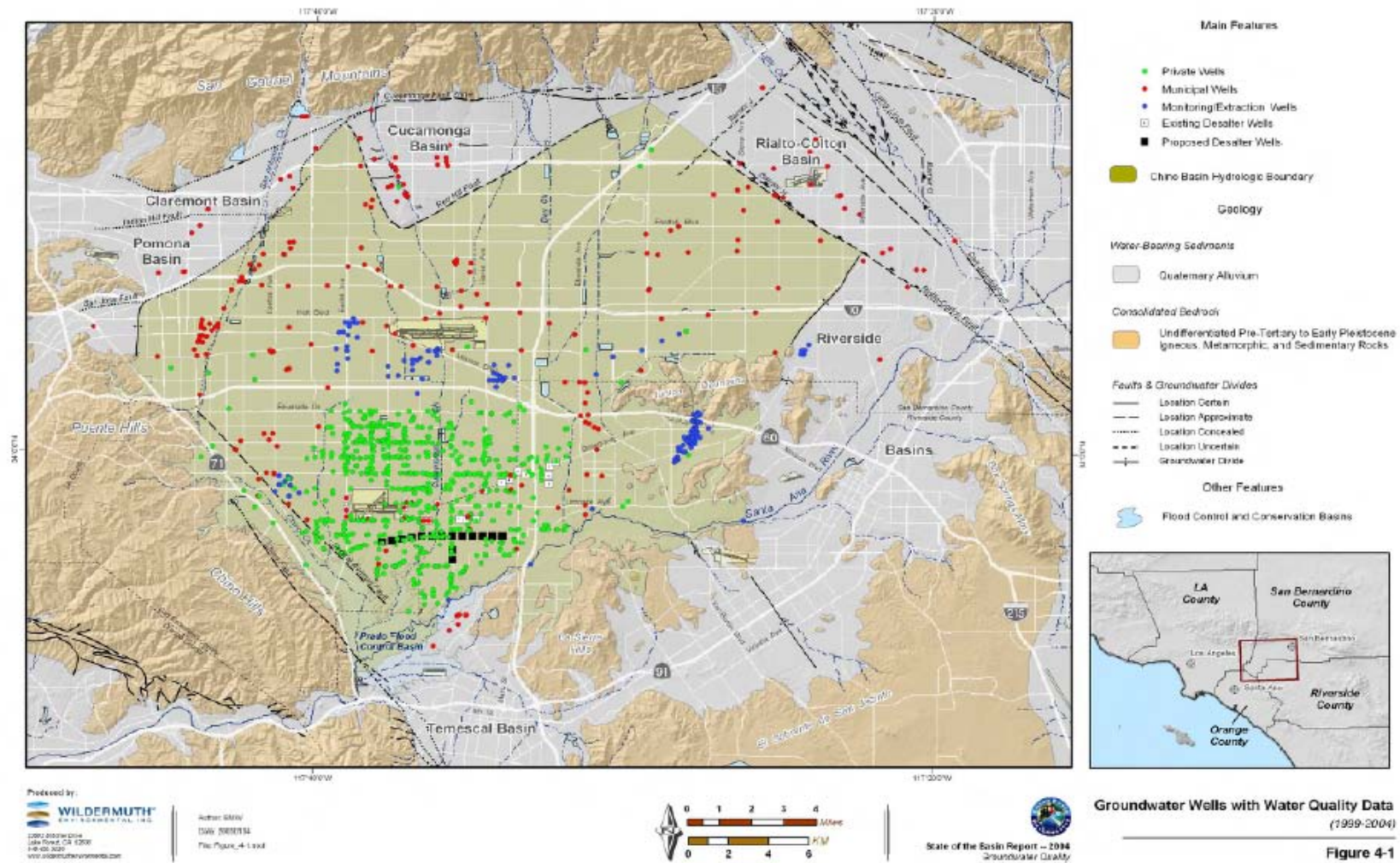
The groundwater quality in Chino Basin is generally good, with better groundwater quality found in the northern portion of Chino Basin where recharge occurs. Salinity (TDS) and nitrate concentrations increase in the southern portion of Chino Basin. About 83 percent of the private wells south of the 60 Freeway had nitrate concentrations greater than the MCL.

The other constituents that have the potential to impact groundwater quality from a regulatory or Basin Plan standpoint are certain VOCs, arsenic, and perchlorate. As discussed in Section 9.12, there are a number of point source releases of VOCs in Chino Basin. These are in various stages of investigation or cleanup.

Likewise, there are known point source releases of perchlorate (Mid-Valley Sanitary Land Fill area, Stringfellow, et cetera) as well as what appears to be non-point source related perchlorate contamination from currently undetermined-sources. Arsenic at levels above its water quality standard appears to be limited to the deeper aquifer zone near the City of Chino Hills.

The Chino Basin Watermaster is coordinating its efforts to address water quality issues in the basin with the Santa Ana Regional Water Quality Control Board to ensure proactive efforts protect the basin quality.

Figure 9-1
Location of Groundwater Wells in Chino Basin



(Adapted from the State of the Basin Report – 2004)

Figure 9-2
Total Dissolved Solids in Well Water in Chino Basin

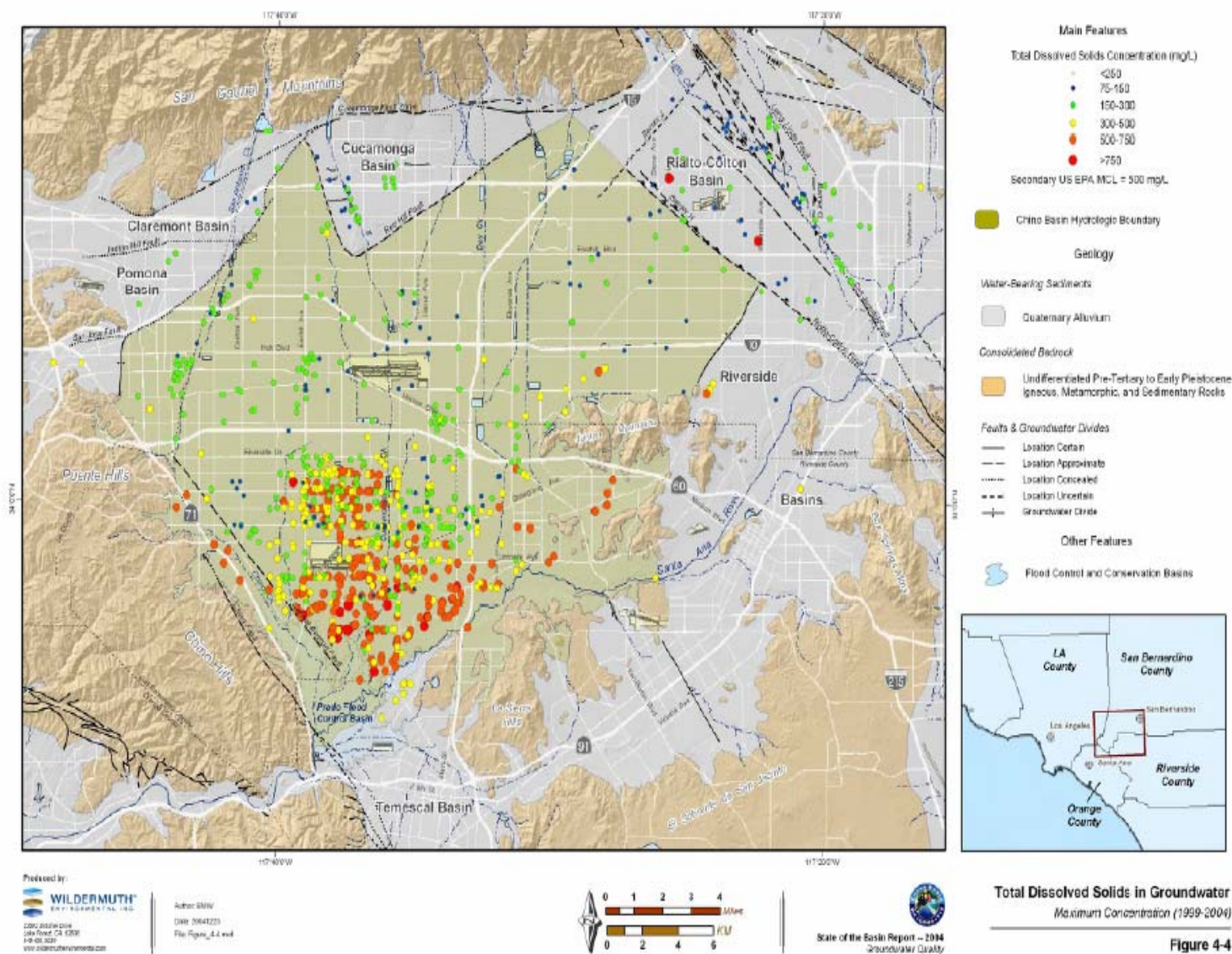


Figure 9-3
Nitrate-Nitrogen in Groundwater

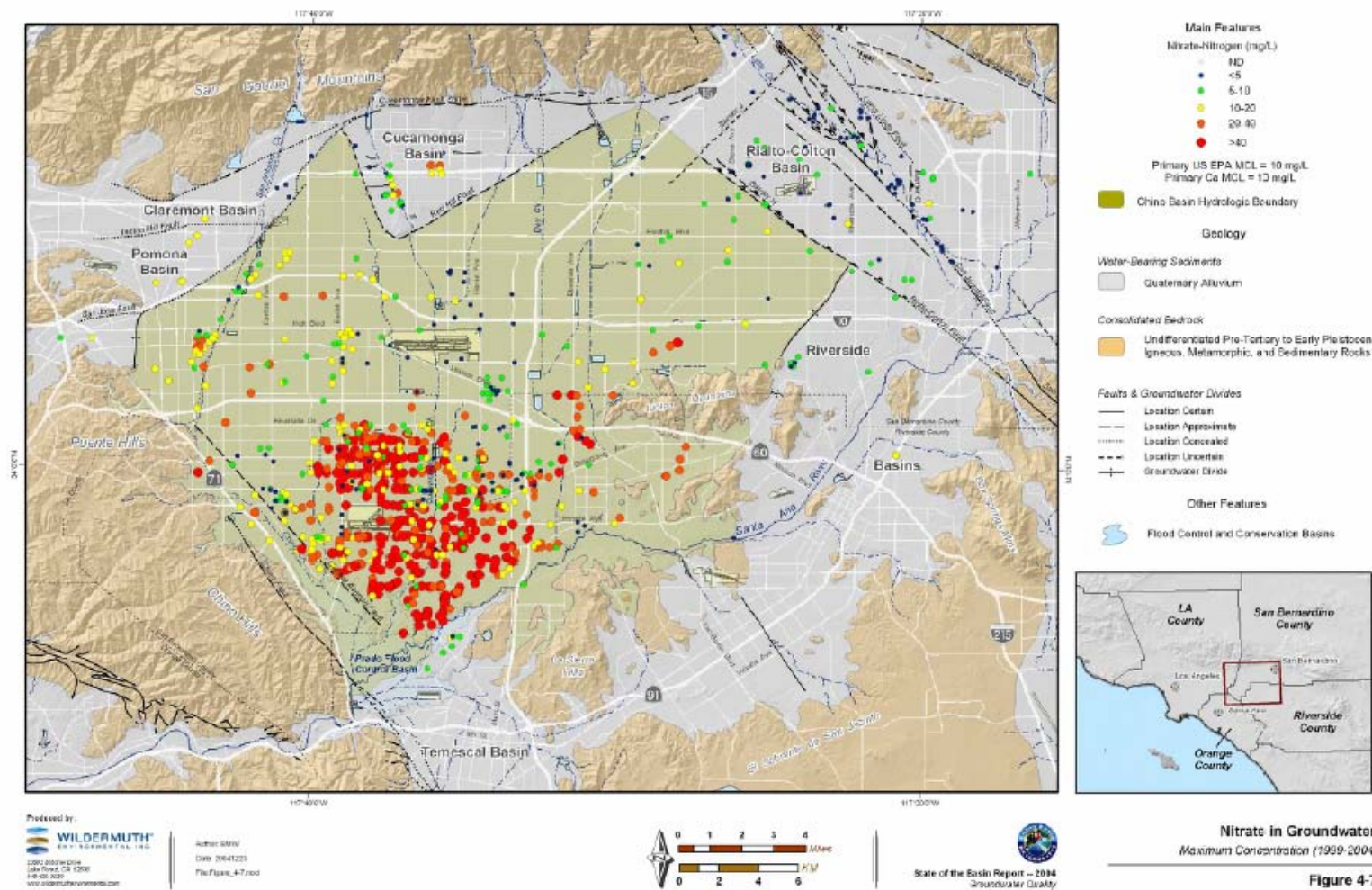


Figure 9-4
Perchlorate in Groundwater

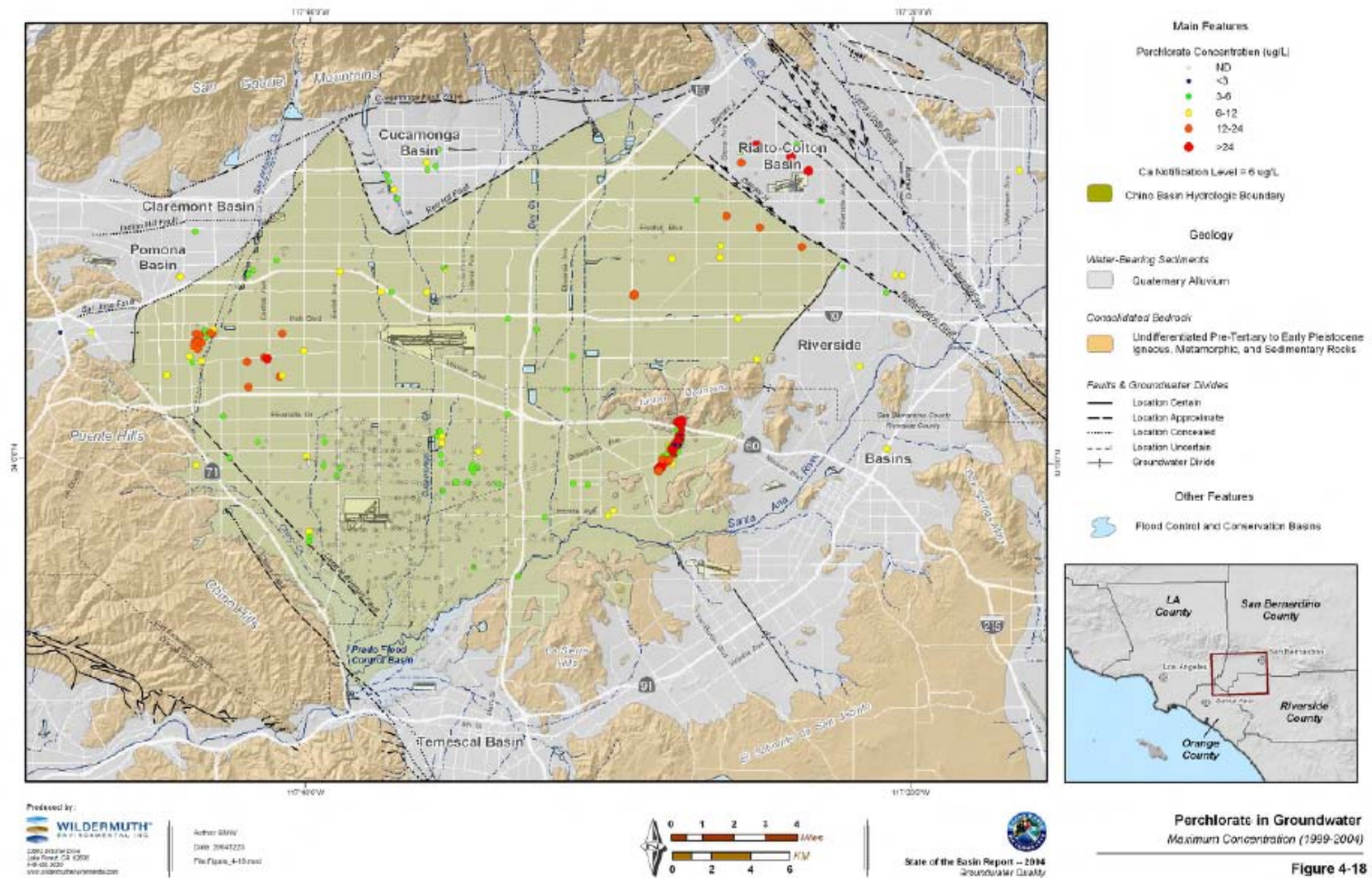


Figure 9-5
Tetrachloroethene in Groundwater

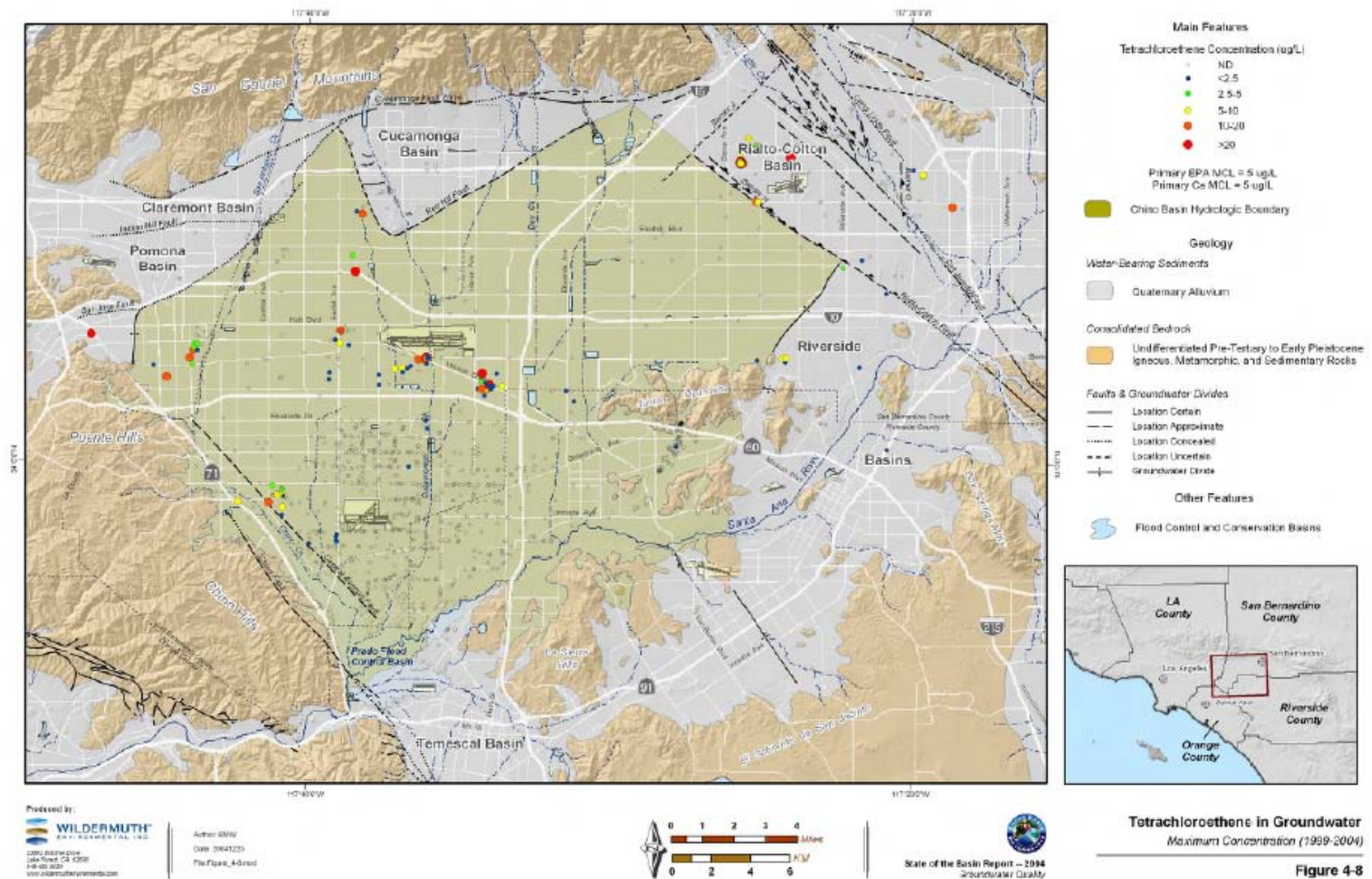


Figure 9- 6
Dichloroethene in Groundwater

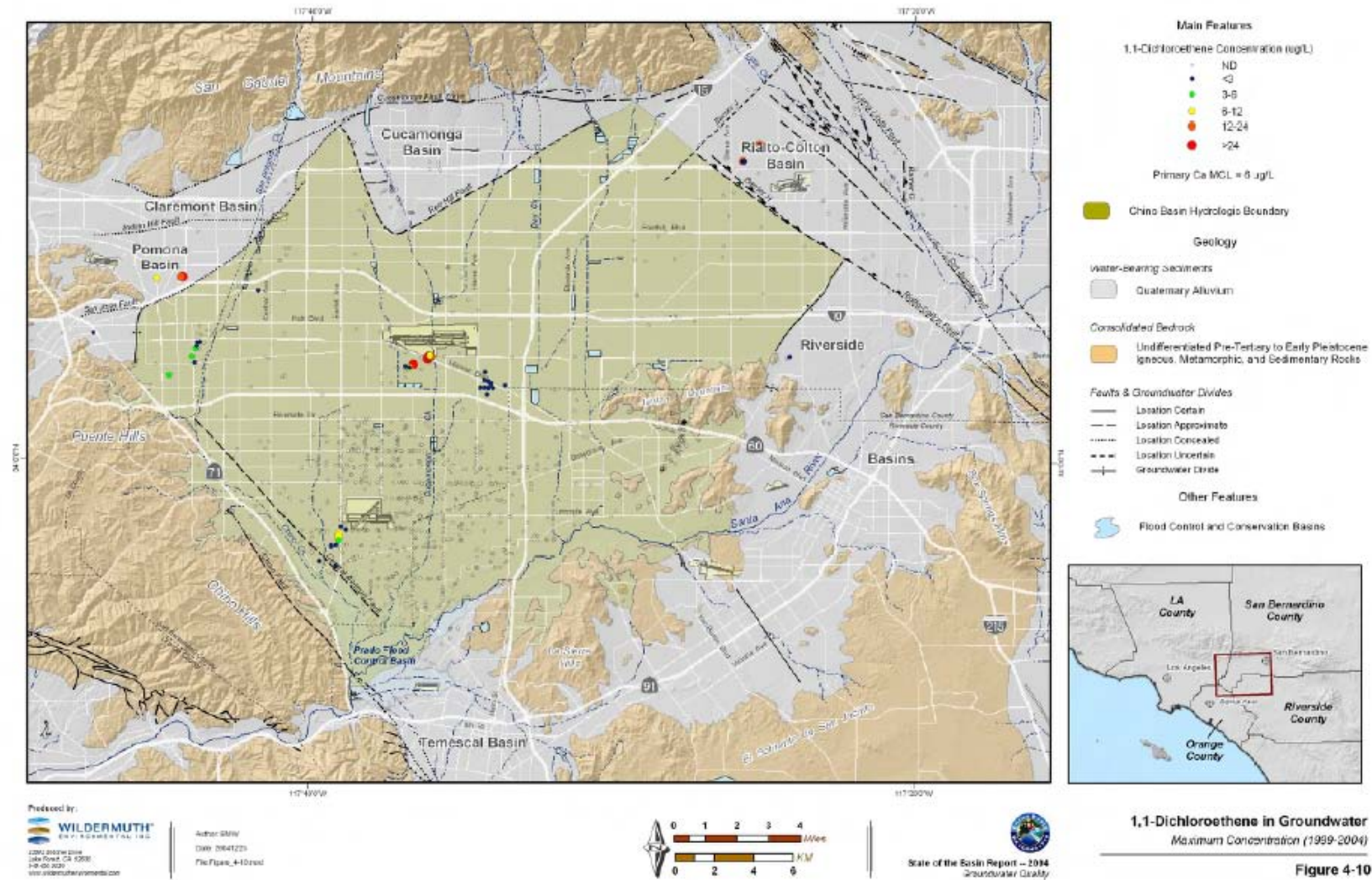


Figure 9-7
Cis-1,2-Dichloroethene in Groundwater

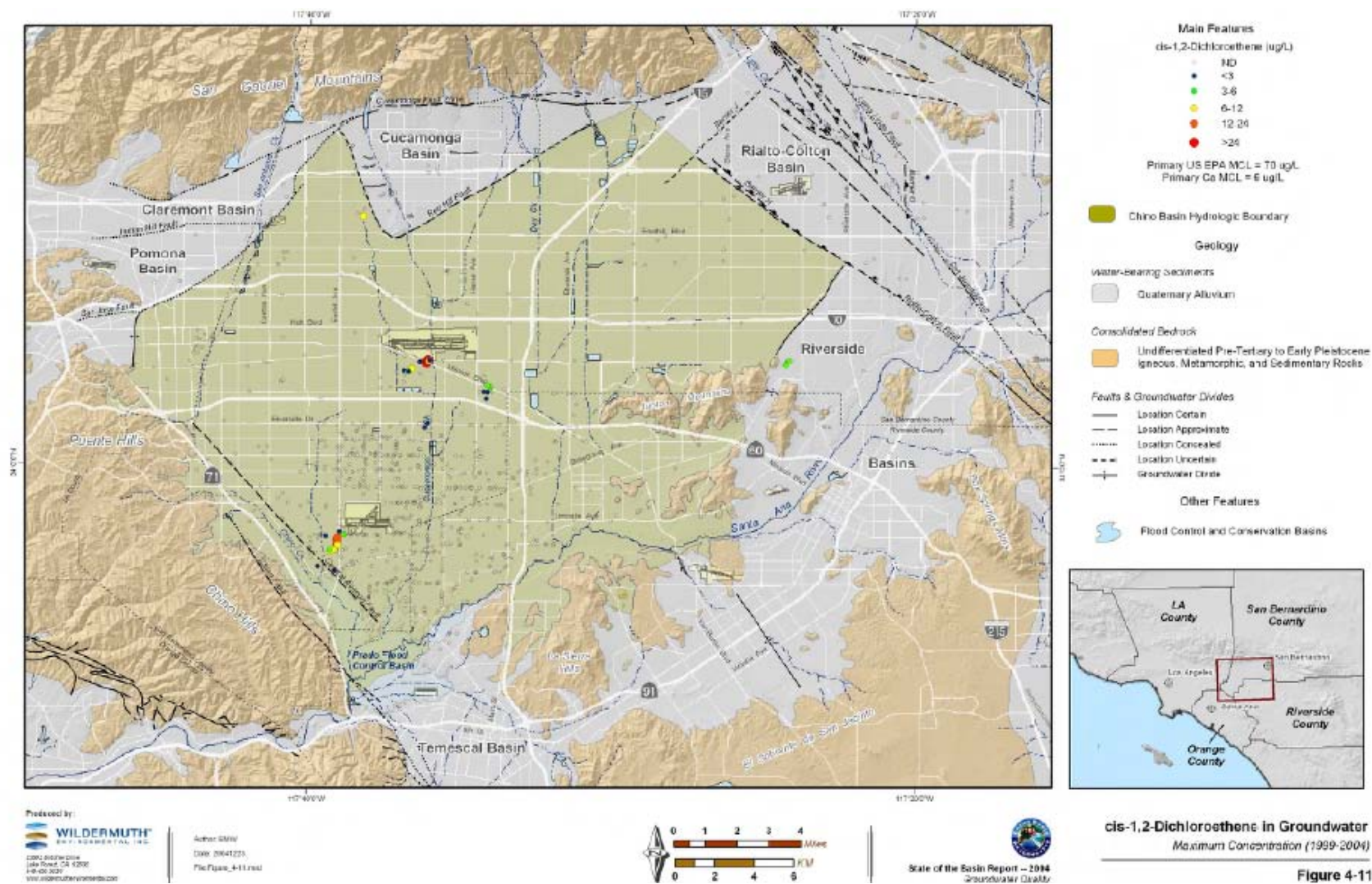
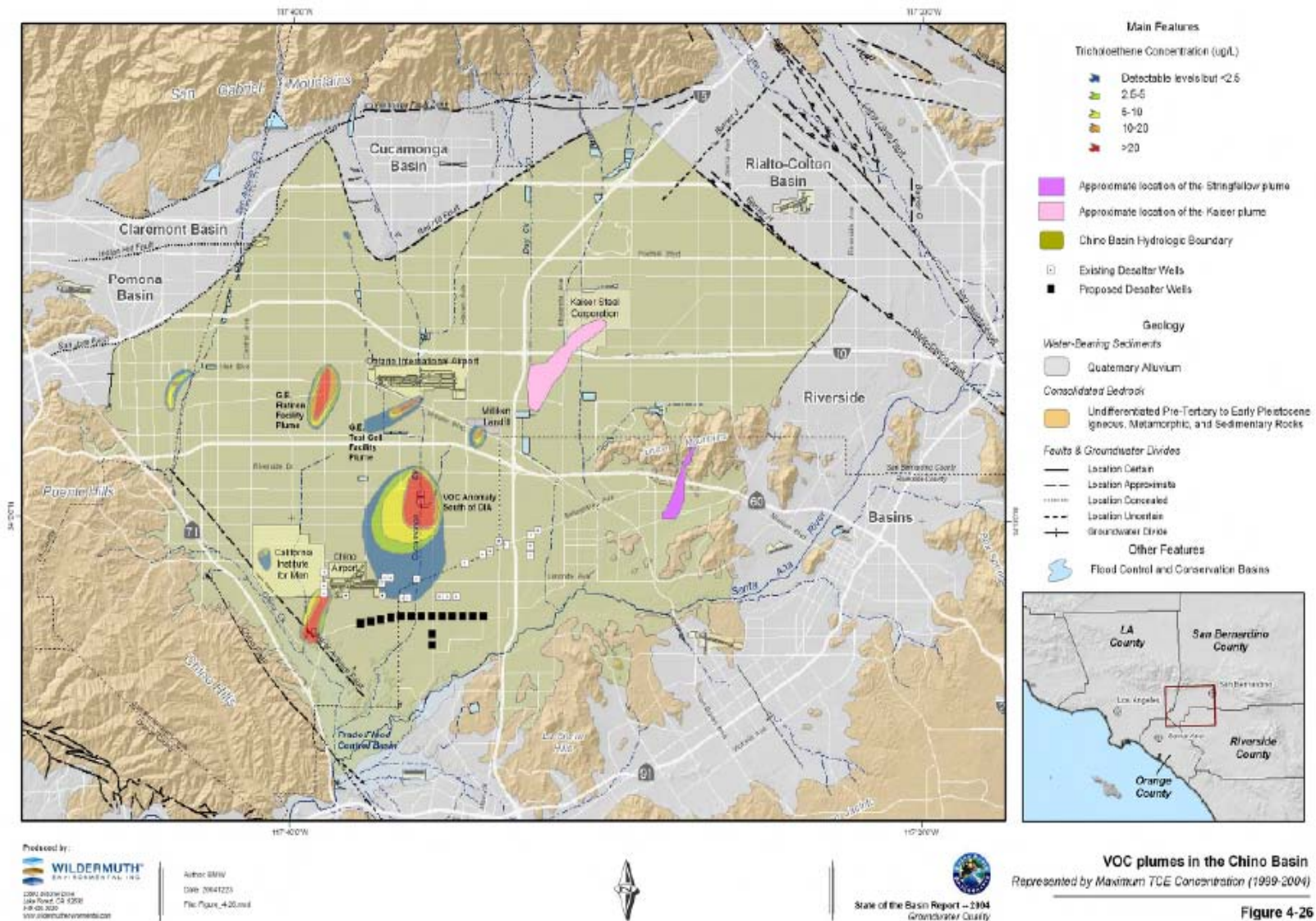


Figure 9-8
VOC Plumes in the Chino Basin



CHAPTER 10 WATER SERVICE RELIABILITY

10.1 RELIABILITY DURING A DROUGHT

The available supplies and water demands for IEUA's service area were analyzed to assess the region's ability to satisfy demands during three scenarios: a normal water year, single dry year, and multiple dry years. The tables in this section present the supply-demand balance for the various drought scenarios for the twenty year planning period 2005-2025. It is expected that the region will be able to meet 100 percent of its dry year demand under every scenario. The following Table 10-1 presents the supply reliability, as percentages of normal water year supplies, for the IEUA service area during normal, single dry, and multiple dry water years.

**Table 10-1
Supply Reliability as Percentage of Normal Water Year Supply**

	Normal Water Year	Single Dry Water Year	Multiple Dry Water Years ⁽²⁾			
			Year 1	Year 2	Year3	Year 4 ⁽³⁾
Groundwater	100%	115%	116%	115%	114%	
Recycled Water	100%	100%	100%	105%	110%	
Surface Water⁽¹⁾	100%	31%	49%	84%	77%	
Imported Water	100%	62%	60%	61%	62%	

Notes:

- (1) Estimated decrease in surface water availability per Prado region 1970-2003 rainfall data. Surface water does not constitute a significant portion of the water supply.
- (2) Chino Basin Dry-Year Yield (DYY) Program facilities provide for 100,000 AF of storage and 33,000 AFY of additional groundwater production for use in-lieu of Imported Water during dry years. The DYY Program is in effect during dry years between 2008 and 2025. Percentages reflect decrease in imported water and associated increase in groundwater production. From MWD's Draft 2005 RUWMP, Sept 2005. Metropolitan has documented the capability to reliably meet 100 percent of projected supplemental water demands through 2030. Per the Fiscal Year 2004/2005 Chino Basin Watermaster Assessment Package, agencies have approximately 150,000 AF in storage.
- (3) MWD's Draft 2005 RUWMP, Sept 2005, provides information for three consecutive dry years.

The historical basis for the supply reliability data is presented in Table 10-2, which summarizes the base years for normal, single dry, and multiple dry water years.

**Table 10-2
Basis of Water Year Data**

Water Year Type	Base Year(s)	Historical Sequence
Normal Water Year	FY 2004	1922-2004 ⁽²⁾
Single Dry Water Year⁽¹⁾	1977 ⁽²⁾	
Multiple Dry Water Years⁽¹⁾	1990-1992 ⁽²⁾	

Notes:

- (1) Rainfall data from Prado region (1970-2003) used as basis for surface water reliability.
- (2) From MWD's Draft 2005 RUWMP, Sept 2005.

The following subsections describe the region's water supply and demand during each of the three scenarios for the next twenty years.

Normal Water Year

The region's water supply is broken down into four categories: groundwater, recycled water, surface water, and imported water. With emphasis on local water supply development within IEUA's service area, including an increase in the availability of recycled water, it is anticipated that the region's dependability on imported water supplies will be reduced by 2025. The Supply Reliability described previously and summarized in Table 10-1 predicts that 100 percent of local and imported supplies will be available to meet the region's demands during a normal water year. The following Table 10-3 presents the projected water supply during a normal year.

Table 10-3
Projected Normal Year Water Supply⁽¹⁾ (AFY)

Supply	2010	2015	2020	2025
Groundwater ⁽²⁾	177,870	191,479	205,704	212,854
Recycled Water	39,000	49,000	58,000	69,000
Surface Water	18,700	18,700	18,700	18,700
Imported Water	68,800	74,300	80,600	82,500
% of Normal Year⁽³⁾				
Groundwater	119%	128%	137%	142%
Recycled Water	3686%	4631%	5482%	6522%
Surface Water	174%	174%	174%	174%
Imported Water	87%	94%	102%	104%

Notes:

- (1) Assumes zero conservation.
- (2) Includes groundwater from Chino Basin (inc. CDA supply) and other basins.
- (3) From Table 10-2.

Table 10-4 summarizes the region's demands during a normal year over the next twenty years. It is estimated that water demands will increase to approximately 334,000 AF by the year 2025. However, as additional recycled water supplies become available and local agencies connect to the recycled water system, the region's dependability on imported water supplies will decrease.

Table 10-4
Projected Normal Year Water Demand (AFY)

	2010	2015	2020	2025
Demand	262,600	287,000	314,900	334,500
% of Year 2005	123%	134%	147%	156%

The comparison between supply and demand for a normal water year is presented in Table 10-5. In a normal year, zero water conservation has been assumed, providing a more conservative assessment of the region's supplies. The region is expected to meet 100 percent of water demands through the year 2025, with an annual surplus ranging from approximately 41,000 to 49,000 AF.

Table 10-5
Projected Normal Year Supply and Demand Comparison (AFY)

	2010	2015	2020	2025
Supply Totals	304,370	333,479	363,004	383,054
Demand Totals	262,600	287,000	314,900	334,500
Difference (Supply minus Demand)	41,770	46,479	48,104	48,554
Difference as % of Supply	14%	14%	13%	13%
Difference as % of Demand	16%	16%	15%	15%

Single Dry Year

The water demands and supplies for IEUA's service area over the next twenty years were analyzed in the event that a single dry year occurs, similar to the drought that occurred in California in 1977¹. The development of groundwater storage, recycled water systems, surface water supplies, and improvements in water quality and conservation, will greatly reduce the need for imported water supplies during dry years. The following paragraphs describe the available water supply to IEUA.

Groundwater. Groundwater supplies represent a significant supplemental source of water for water agencies within the IEUA service area. The majority of groundwater is produced from the Chino Basin with additional water produced from other local groundwater basins. The Chino Basin is the largest groundwater basin in the Upper Santa Ana Watershed, currently containing 5,000,000 AF of water in storage with an unused storage capacity of approximately 1,000,000 AF. Water rights within the Chino Basin have been adjudicated and the average safe-yield of the Basin is 140,000 AFY. It is anticipated that when over-pumping is required during a single dry year event, additional groundwater pumped beyond the safe yield of the Basin will be replenished during wet or normal years with imported water purchased from the Metropolitan Water District of Southern California (MWD) and with supplemental water from recycled and/or surface supplies.

IEUA, the Chino Basin Watermaster (Watermaster), and MWD have developed the Chino Basin Dry-Year Yield Program (DYY Program) to help alleviate demands on imported water during dry years by pumping additional groundwater. Three Valleys Municipal Water District is also a signatory to the Program. The DYY Program is the first step in a phased plan to develop and implement a

¹ MWD Draft 2005 RUWMP, Sept 2005

comprehensive conjunctive use program to allow maximum use of imported water available during wet years and stored groundwater in the Chino Basin during dry years. Imported water deliveries to participants would increase during wet or normal (or “put”) years, and purchase of imported water would decrease during dry (or “take”) years. Collectively, the eight DYY participants, six of which are local retail agencies of IEUA, would meet predetermined amounts to achieve a 25,000 AFY “put” and a 33,000 AFY “take”. Each of the local retail agencies volunteered to produce excess groundwater during a dry year in-lieu of normal imported water deliveries. In exchange, they received funding for new groundwater treatment and well facilities that would allow excess groundwater production during dry years. IEUA’s overall imported water demands during dry years would decrease by 29,000 AFY, which equals the portion of the 33,000 AFY of the DYY shift obligation for IEUA’s local retail agencies, as shown in Table 10-6.

**Table 10-6
Participating Agencies DYY Shift Obligations**

Local Retail Agency	DYY Program Shift Obligation (AFY)
City of Chino	1,159
City of Chino Hills	1,448
Cucamonga Valley Water District	11,353
Jurupa Community Services District ⁽¹⁾	2,000
Monte Vista Water District	3,963
City of Ontario	8,076
City of Pomona ⁽¹⁾	2,000
City of Upland	3,001
Total	33,000

Notes:

(1) Agencies not within the IEUA service area.

During dry years when the DYY Program is active, groundwater production will increase to approximately 116 percent of a normal year.

Recycled Water. Recycled water is becoming an increasingly important source of local water for the region. Recycled water is a critical component of the Optimum Basin Management Plan (OBMP), developed in 2000, to address water quality issues in the Chino Basin. Current use of recycled water within the region is approximately 7,000 AFY and is expected to increase to nearly 69,000 AF by 2025. During a single dry year, it has been assumed that recycled water will be 100 percent reliable.

Surface Water. A portion of the water supply for the IEUA service area is comprised of surface water. The principal sources of surface water include San Antonio Canyon, Cucamonga Canyon, Day Creek, Lytle Creek and several smaller surface streams. Currently, the region receives approximately 18,700 AFY of surface water, which is expected to hold constant through 2025. During a dry year, however, it is anticipated that the availability of surface supplies will decrease. For a single dry year event, surface supplies are assumed to have 31

percent reliability, which is estimated based upon historical rainfall data in the Prado region during the years 1970-2003. Water Year 2001-2002 was the driest on record with 5.08 inches of precipitation.

Imported Water. Southern California expects to have a reliable water supply for the foreseeable future due to the integrated resources planning effort of the Metropolitan Water District of Southern California (MWD) and its member agencies. As a water wholesaler, MWD supplies imported water to IEUA to meet the water needs of its service area at the lowest possible cost. MWD's *Report on Metropolitan's Water Supplies*, dated March 25, 2003, describes how MWD has created a diverse resource portfolio and aggressive conservation program to protect the reliability of the entire system. MWD demonstrates that sufficient supplies can be reasonably relied upon to meet projected supplemental demands. The report outlines MWD's Comprehensive Supplemental Supply Plan, which if implemented, would provide MWD with the capability to reliably meet projected supplemental water demands through 2030.² As a result, during a single dry year event, MWD will have the resources to supply IEUA with 100 percent of their imported water demands. However, as discussed previously, with the DYY Program in effect, several of IEUA's retail agencies will reduce their imported water demand by their DYY Program shift, thus reducing demands on Metropolitan. During a dry year, imported water demands are expected to decrease to approximately 58 percent.

Tables 10-7 through 10-9 summarize the projected single dry year water supply and demand for the years 2010 through 2025.

**Table 10-7
Projected Single Dry Year Water Supply (AFY)**

Supply	2010	2015	2020	2025
Groundwater	208,133	221,733	235,950	243,091
Recycled Water	39,000	49,000	58,000	69,000
Surface Water	5,817	5,817	5,817	5,817
Imported Water	39,800	45,300	51,600	53,500
% of Normal Year				
Groundwater	117%	116%	115%	114%
Recycled Water	100%	100%	100%	100%
Surface Water	31%	31%	31%	31%
Imported Water	58%	61%	64%	65%

Notes:

(1) Projected normal use from Table 10-3.

² MWD's 2005 RUWMP, Sept 2005

Table 10-8
Projected Single Dry Year Water Demand (AFY)

	2010	2015	2020	2025
Demand	262,600	287,000	314,900	334,500
Conservation⁽¹⁾	(26,260)	(28,700)	(31,490)	(33,450)
Adjusted Demand	236,340	258,300	283,410	301,050
% of Projected Normal⁽²⁾	90%	90%	90%	90%

Notes:

- (1) Assumed 10% conservation of demand for single dry years.
- (2) Projected Normal Use from Table 10-4.

Table 10-9
Projected Single Dry Year Supply and Demand Comparison (AFY)

	2010	2015	2020	2025
Supply Totals	292,750	321,850	351,367	371,408
Demand Totals	236,340	258,300	283,410	301,050
Difference (Supply minus Demand)	56,410	63,550	67,957	70,358
Difference as % of Supply	19%	20%	19%	19%
Difference as % of Demand	24%	25%	24%	23%

Multiple Dry Years

The water demands and supplies for IEUA's service area over the next twenty years were analyzed in the event that a multiple dry year occurs, similar to the drought that occurred during the years 1990-1992³. The following paragraphs describe the available water supply to IEUA during a multiple dry year period.

Groundwater. Similar to the Single Dry Year scenario described previously, implementing the DYY Program requires local retail agencies to produce additional groundwater in-lieu of accepting imported water deliveries. Each agency pumps additional groundwater in the amount of their shift obligation. Production in excess of the safe yield of the Basin is replaced with replenishment water during wet or normal years. With the DYY Program in place, groundwater has been assumed to be approximately 117 percent reliable during dry years.

Recycled Water. During multiple dry years, the use of recycled water for irrigation and other purposes helps reduce overall water demands. It has been assumed that during multiple dry years, the production of recycled water will gradually increase from 100 percent during the first dry year to 105 and 110 percent, respectively, during the next two subsequent dry years as more customers become connected to the recycled water system.

³ MWD's Draft RUWMP, Sept 2005

Surface Water. Though surface water provides a supplemental source of water during normal years, the volume of available surface water is expected to decrease in a multiple dry year scenario. Surface water reliability was estimated using rainfall data for the Prado region during the years 1970-2003. This decrease in available supplies can be offset by implementation of a conservation program during dry years or through pumping of additional groundwater. Surface water reliability is anticipated to be in the range of 49 to 84 percent during a multiple year drought.

Imported Water.

During multiple dry years, local agencies reduce their imported water demands by increasing groundwater production in accordance with the DYY Program. The DYY Program reduces imported water demands by approximately 40 percent, thereby conserving Metropolitan's supplies during a drought.

The following Tables 10-10 through 10-12 summarize the projected multiple dry year water supply and demand for five-year periods during the years 2010 through 2025. Each five year period is contains three consecutive dry years where the DYY Program and conservation programs are implemented.

Tables 10-10 through 10-12: 2006-2010

Table 10-10
Projected Supply During Multiple Dry Year Period Ending in 2010 (AFY)

	(normal)	(normal)	(dry)	(dry)	(dry)
Supply⁽¹⁾	2006	2007	2008⁽²⁾	2009⁽²⁾	2010⁽²⁾
Groundwater	143,304	151,946	190,215	198,229	206,870
Recycled Water	13,616	19,962	26,308	34,287	42,900
Surface Water	18,700	18,700	9,252	15,780	14,474
Imported Water	65,720	65,240	36,760	38,280	39,800
% of Projected Normal⁽³⁾					
Groundwater	100%	100%	118%	117%	116%
Recycled Water	100%	100%	100%	105%	110%
Surface Water	100%	100%	49%	84%	77%
Imported Water	100%	100%	56%	57%	58%

Notes:

(1) Supply values extrapolated from 2005 and 2010 data.

(2) DYY Program assumed to begin in year 2008 according to the Master Agreement. DYY Program in effect during multiple dry years.

(3) Projected Normal Use from Table 10-3.

Table 10-11
Projected Demand During Multiple Dry Year Period Ending in 2010 (AFY)

	(normal)	(normal)	(dry)	(dry)	(dry)
	2006	2007	2008	2009	2010
Demand	223,871	233,553	243,236	252,918	262,600
Conservation⁽¹⁾	0	0	(24,324)	(25,292)	(26,260)
Adjusted Demand	223,871	233,553	218,912	227,626	236,340
% of Projected Normal⁽²⁾	100%	100%	90%	90%	90%

Notes:

(1) Assumed 10% conservation of demand for dry years. Refer to Chapter 4, Water Conservation Program.

(2) Projected Normal Use from Table 10-4.

Table 10-12
Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2010 (AFY)

	(normal)	(normal)	(dry)	(dry)	(dry)
	2006	2007	2008	2009	2010
Supply Totals	241,340	255,848	262,536	286,575	304,044
Demand Totals	223,871	233,553	218,912	227,626	236,340
Difference (Supply minus Demand)	17,469	22,294	43,624	58,949	67,704
Difference as % of Supply	7%	9%	17%	21%	22%
Difference as % of Demand	8%	10%	20%	26%	29%

Tables 10-13 through 10-15: 2011-2015

Table 10-13
Projected Supply During Multiple Dry Year Period Ending in 2015 (AFY)

	(normal)	(dry)	(dry)	(dry)	(normal)
Supply⁽¹⁾⁽²⁾	2011	2012	2013	2014	2015
Groundwater	180,592	212,936	215,035	217,757	191,479
Recycled Water	41,000	43,000	47,250	51,700	49,000
Surface Water	18,700	9,252	15,780	14,474	18,700
Imported Water	69,900	42,000	43,100	44,200	74,300
% of Projected Normal⁽³⁾					
Groundwater	100%	116%	116%	115%	100%
Recycled Water	100%	100%	105%	110%	100%
Surface Water	100%	49%	84%	77%	100%
Imported Water	100%	59%	60%	60%	100%

Notes:

(1) Supply values extrapolated from 2010 and 2015 data.

(2) DYY Program assumed to begin in year 2008 according to the Master Agreement. DYY Program in effect during multiple dry years.

(3) Projected Normal Use from Table 10-3.

Table 10-14
Projected Demand During Multiple Dry Year Period Ending in 2015 (AFY)

	(normal)	(dry)	(dry)	(dry)	(normal)
	2011	2012	2013	2014	2015
Demand	267,480	272,360	277,240	282,120	287,000
Conservation⁽¹⁾	0	(27,236)	(27,724)	(28,212)	0
Adjusted Demand	267,480	245,124	249,516	253,908	287,000
% of Projected Normal⁽²⁾	100%	90%	90%	90%	100%

Notes:

(1) Assumed 10% conservation of demand for multiple dry years.

(2) Projected Normal Use from Table 10-4.

Table 10-15
Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2015 (AFY)

	(normal)	(dry)	(dry)	(dry)	(normal)
	2011	2012	2013	2014	2015
Supply Totals	310,192	307,188	321,165	328,131	333,479
Demand Totals	267,480	245,124	249,516	253,908	287,000
Difference (Supply minus Demand)	42,712	62,064	71,649	74,223	46,479
Difference as % of Supply	14%	20%	22%	23%	14%
Difference as % of Demand	16%	25%	29%	29%	16%

Tables 10-16 through 10-18: 2016-2020

Table 10-16
Projected Supply During Multiple Dry Year Period Ending in 2020 (AFY)

	(normal)	(dry)	(dry)	(dry)	(normal)
Supply⁽¹⁾⁽²⁾	2016	2017	2018	2019	2020
Groundwater	194,324	226,782	229,014	231,859	205,704
Recycled Water	50,800	52,600	57,120	61,820	58,000
Surface Water	18,700	9,252	15,780	14,474	18,700
Imported Water	75,560	47,820	49,080	50,340	80,600
% of Projected Normal⁽³⁾					
Groundwater	100%	115%	114%	114%	100%
Recycled Water	100%	100%	105%	110%	100%
Surface Water	100%	49%	84%	77%	100%
Imported Water	100%	62%	63%	63%	100%

Notes:

(1) Supply values extrapolated from 2015 and 2020 data.

(2) DYY Program assumed to begin in year 2008 according to the Master Agreement. DYY Program in effect during multiple dry years.

(3) Projected Normal Use from Table 10-3.

Table 10-17
Projected Demand During Multiple Dry Year Period Ending in 2020 (AFY)

	(normal)	(dry)	(dry)	(dry)	(normal)
	2016	2017	2018	2019	2020
Demand	292,580	298,160	303,740	309,320	314,900
Conservation⁽¹⁾	0	(29,816)	(30,374)	(30,932)	0
Adjusted Demand	292,580	268,344	273,366	278,388	314,900
% of Projected Normal⁽²⁾	100%	90%	90%	90%	100%

Notes:

(1) Assumed 10% conservation of demand for multiple dry years.

(2) Projected Normal Use from Table 10-4.

Table 10-18
Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2020 (AFY)

	(normal)	(dry)	(dry)	(dry)	(normal)
	2016	2017	2018	2019	2020
Supply Totals	339,384	336,454	350,994	358,493	363,004
Demand Totals	292,580	268,344	273,366	278,388	314,900
Difference (Supply minus Demand)	46,804	68,110	77,628	80,105	48,104
Difference as % of Supply	14%	20%	22%	22%	13%
Difference as % of Demand	16%	25%	28%	29%	15

Tables 10-19 through 10-21: 2021-2025

Table 10-19
Projected Supply During Multiple Dry Year Period Ending in 2025 (AFY)

	(normal)	(dry)	(dry)	(dry)	(normal)
Supply⁽¹⁾⁽²⁾	2021	2022	2023	2024	2025
Groundwater	207,134	23,169	238,994	240,424	212,854
Recycled Water	60,200	62,400	67,830	73,480	69,000
Surface Water	18,700	9,252	15,780	14,474	18,700
Imported Water	80,980	52,360	52,740	53,120	82,500
% of Projected Normal⁽³⁾					
Groundwater	100%	114%	114%	114%	100%
Recycled Water	100%	100%	105%	110%	100%
Surface Water	100%	49%	84%	77%	100%
Imported Water	100%	64%	65%	65%	100%

Notes:

(1) Supply values extrapolated from 2020 and 2025 data.

(2) DYY Program assumed to begin in year 2008 according to the Master Agreement. DYY Program in effect during multiple dry years.

(3) Projected Normal Use from Table 10-3.

Table 10-20
Projected Demand During Multiple Dry Year Period Ending in 2025 (AFY)

	(normal)	(dry)	(dry)	(dry)	(normal)
	2021	2022	2023	2024	2025
Demand	318,820	322,740	326,660	330,580	334,500
Conservation⁽¹⁾	0	(32,274)	(32,666)	(33,058)	0
Adjusted Demand	318,820	290,466	293,994	297,522	334,500
% of Projected Normal⁽²⁾	100%	90%	90%	90%	100%

Notes:

(1) Assumed 10% conservation of demand for multiple dry years.

(2) Projected Normal Use from Table 10-4.

Table 10-21
Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2025 (AFY)

	(normal)	(dry)	(dry)	(dry)	(normal)
	2021	2022	2023	2024	2025
Supply Totals	367,014	362,181	375,344	381,498	383,054
Demand Totals	318,820	290,466	293,994	297,522	334,500
Difference (Supply minus Demand)	48,194	71,715	81,350	83,976	48,554
Difference as % of Supply	13%	20%	22%	22%	13%
Difference as % of Demand	15%	25%	28%	28%	15%

10.2 WATER AGENCY INTERCONNECTIONS

Several local agencies have had the ability to provide their neighbor agencies with water supplies during periods of extraordinary high demand or temporary disruptions in imported supply. Other agencies provide water supplies to other agencies as a matter of routine business agreements. This is generally the result of a lack of capacity to pump local groundwater supplies.

These interconnections are extremely important because the ability to move water around the Chino Basin to provide an important level supply reliability for all the local agencies.

Current interconnections include the Monte Vista Water District which provides an annual supplementary water supply to the City of Chino Hills. This amounts to as much as 10,000 acre-feet each year. Other interconnections occur between the Cucamonga Valley Water District and the Fontana Water Company. Cucamonga Valley Water District provides as much as 5,000 acre-feet annually to Fontana Water Company. In addition, the Chino Desalter Authority as a part of the Chino 1 expansion and the new Chino 2 Desalter have interconnected all the participating agencies with a common supply with booster pumps and storage reservoirs which will allow substantial flexibility and enhanced reliability for delivery water among the agencies during emergency outages or future drought episodes. Finally, an important interconnection occurs between the City of Ontario and the City of Chino.

10.3 MWD SERVICE LINE CAPITAL IMPROVEMENTS

For reasons of water quality, the Santa Ana Regional Water Quality Control Board allows only State Water Project imported supplies to be delivered to the IEUA service area. (Colorado River supplies are too high in TDS to be used in the Chino Basin.) By having only one source of imported water supply, the region is dangerously susceptible to emergency disruptions. This became quite evident in June 2004 when MWD had to conduct an unplanned shutdown of the Rialto Feeder to make emergency repairs. Many local agencies suffered through as much as a 50 percent loss of supply for one week while MWD conducted their repair operations.

This emergency outage showed the vulnerability of the IEUA service area should a catastrophic disruption of MWD supply occur again during the summer months when demand for imported supplies is at its highest. As a result, MWD, working with local agencies, identified several key points along the Rialto Feeder where isolation valves could be installed. Installation of these valves would provide a greater level of reliability to local agencies. In the event of a break in the Rialto Feeder, only a portion of the Feeder may need to be shutdown instead of the entire pipeline being shutdown from the Devils Canyon Forebay to LaVerne

(approximately 30 miles). Interconnections and mutual aid agreements between the local agencies would likely be sufficient to provide adequate supplies during the emergency period.

10.4 MUTUAL AID AGREEMENTS

Mutual aid agreements among local agencies in California are a typical way of dealing effectively with disasters such as brush fires, earthquakes, law enforcement shortages, etc., and the IEUA service area is no different.

As the agency that provides regional sewer service to the seven cities and agencies in the service area (referred to as Regional Contracting Agencies), IEUA took the lead to develop a United Response Guidance Plan for Sanitary Sewer Overflows at the request of the Santa Ana Regional Water Quality Control Board (SARWQCB). The purpose of the SARWQCB's request was the need for a united and coordinated approach for sanitary sewer spills and their possible infiltration into the storm sewers of San Bernardino County. With the joint efforts of IEUA and the Regional Contracting Agencies, the United Response Plan was developed and submitted to the SARWQCB and the San Bernardino County Flood Control District.

The agreement helps to minimize the environmental impact of a sanitary sewer overflow by facilitating communication, dispatching appropriate equipment, reducing spillage, and expediting cleanup. In addition to sewer spills, the Contracting Agencies also agree to provide mutual aid in the event of disruption of water service supply as well. This element of the agreement provides the basis for a full spectrum of mutual aid should any unforeseen disruption occur. Specifically, the agreement says:

"In the event of any disruption or damage to the ability of either Inland Empire Utilities Agency or the Regional Contracting Agencies to continue to serve the public or its customers with water service, sewer service or sewage treatment service, the other party will cooperate to a maximum extent possible, as determined in its discretion, to provide mutual aid assistance as requested."

This mutual aid agreement provides an important basis for supporting reliability in the IEUA service area.

10.5 MWD IMPORTED WATER RELIABILITY

In 2002, the California Legislature enacted two pieces of legislation to better coordinate water supply and land use planning. These two bills were Senate Bill (SB) 221 (Kuehl) and SB 610 (Costa). These laws require new development to meet certain criteria and provide "substantial evidence" of available water supplies in the event of drought. In response to the new laws, the Metropolitan

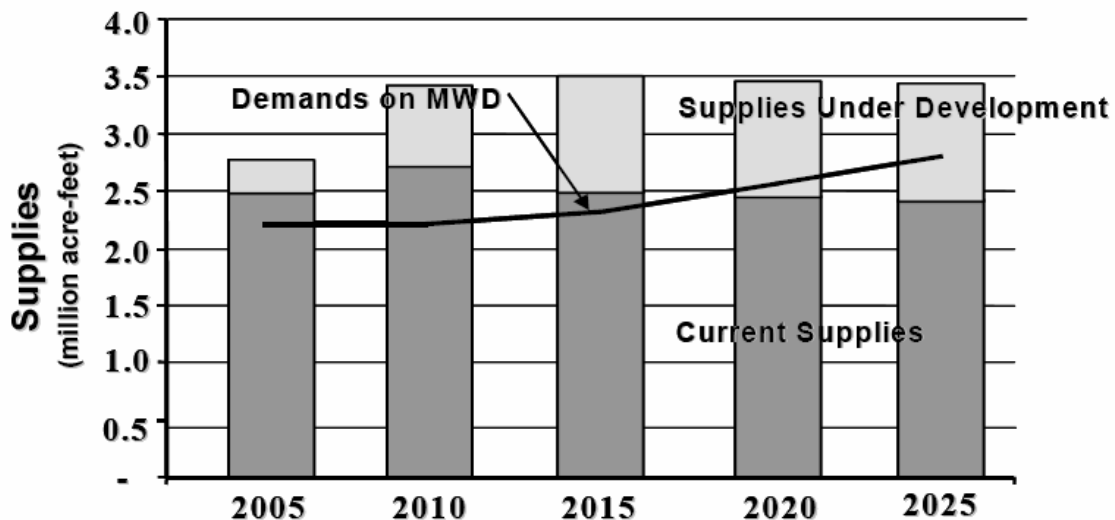
Water District of Southern California (MWD) produced *Report on Metropolitan Water Supplies* in February 2002, and then updated the document in March 2003.

As a result of MWD's Integrated Resource Planning (IRP) process that was begun in 1996, MWD began to diversify the portfolio of their available supply sources. The findings of the Report show that the diversification strategy is working well to create greater reliability for all the retail water agencies that are dependant upon MWD for all or a portion of the supplies. The Report further states that if all of MWD's supply programs and local projects proceed as planned, without changes in demand projections, MWD reliability is assured for the next twenty years and beyond. Figure 10-1 is an MWD multiple dry year, supply and demand graphic that illustrates MWD's ability to be reliable through 2025.

Figure 10-1

**Multiple Dry-year Supply Capability¹
& Projected Demands²**

(Repeat of 1990-92 Hydrology)



¹From MWD's Draft UWMP (Sept 2005). Expected supply capability for resource programs.

²CRA deliveries limited to 1.2 MAF per year.

CHAPTER 11

UWMP ADOPTION AND IMPLEMENTATION

The process for formally adopting Inland Empire Utilities Agency's (IEUA) 2005 Urban Water Management Plan (UWMP) and submitting it to the California Department of Water Resources is prescribed in Water Code sections 10640 through 10645. In addition, IEUA is required to review any amendments to the conservation and water recycling plans that were adopted as part of IEUA's 2000 UWMP.

11.1 UWMP ADOPTION PROCESS

The IEUA's 2005 UWMP was prepared in accordance with the State of California Water Code sections 10610 through 10657. In those sections, an UWMP adoption process is discussed for water agencies to follow.

In June 2005, a draft UWMP was submitted by IEUA to all water related agencies and municipalities in the IEUA service area as well as the Metropolitan Water District of Southern California and the San Bernardino County Department of Planning. All of these agencies/organizations were invited to review the draft plan as well as the population and water supply/demand assumptions and provide comments to IEUA.

Comments were received and the UWMP was updated and submitted to the IEUA Board of Directors in October 2005 for a public review period. A hard copy of the Draft 2005 UWMP was made available for public review at the IEUA Headquarters in Chino, California. The Draft 2005 UWMP was also posted on the IEUA website to invite public review and comment.

In October 2005, a public review period was announced to all water agencies and the general public through letters and newspaper advertisements that the public will have about 30 days to review and provide comment on the Draft 2005 UWMP. These notices are included as Appendix E. The IEUA 2005 UWMP was formally adopted by resolution by the IEUA Board of Directors on November 16, 2005 and submitted to the California Department of Water Resources and cities and county within 30 days of adoption in accordance with state law. The adoption resolution is included as Appendix F.

11.2 2000 UWMP CONSERVATION AND WATER RECYCLING PLAN IMPLEMENTATION

As part of the Urban Water Management Planning Act, IEUA is required to review its Water Conservation Plan and the Water Recycling Plan from the 2000 UWMP and provide a review of the implementation that occurred.

2000 Conservation Program Implementation

The cornerstone of IEUA's water conservation efforts is the implementation of the Best Management Practices (BMP) outlined in the statewide Memorandum of Understanding (MOU). (Note that the MOU and the fourteen BMPs are fully described in Chapter 4.) Since IEUA is a member of the CUWCC in good standing, IEUA has included its 2002 and 2004 BMP bi-annual reports to the California Urban Water Conservation Council in the appendix as an option to writing our implementation efforts of the Demand Management Measures described in California Water Code section 10631. Chapter 4 focuses on the specific water conservation goals for the IEUA service area and the plan to achieve to achieve those goals.

In the 2000 UWMP, IEUA introduced long term water conservation goals that included water savings and the necessary funding requirements. The three main goals of the 2000 UWMP water conservation program are as follows:

- IEUA expects to reduce water demands by 24,000 AF by 2020.
- Over the next five years, IEUA will increase its regional conservation funding using various sources of revenues to reach an annual local investment of \$300,000.
- IEUA expects to expand the conservation programs currently offered to meet and exceed the Best Management Practices (BMP).

Over the last five years, IEUA met and exceeded each of these three goals:

- IEUA achieved a water savings of 8,100 AF (see Chapter 2). This is on-track to meet or exceed the goal of 24,000 AF by 2020.
- In cooperation with the local retail agencies, IEUA established a local revenue stream of over \$600,000 and a leveraged regional conservation fund of over \$1.2 million.
- IEUA and Metropolitan Water District developed local and regional conservation programs that assisted all local water agencies to meet their BMP implementation requirements and developed programs that exceeded the BMP's. (IEUA's reports to the California Urban Water

Conservation Council (CUWCC) on BMP implementation are included as Appendix B.)

2000 Recycled Water Program Implementation

Inland Empire Utilities Agency and the local retail water agencies have been working in cooperation with the Chino Basin Watermaster to develop and implement a comprehensive program to beneficially reuse the region's supply of recycled water (IEUA's Recycled Water Plans are fully described in Chapter 5).

In January 2002, IEUA completed a Recycled Water System Feasibility Study. The study builds upon these collaborative efforts and specifically incorporates the findings and recommendations of the Chino Basin Optimum Basin Management Plan (OBMP) Phase I Report (August 1999) and the Chino Basin Recharge Master Plan Phase II Report (August 2001). The feasibility study, the OBMP report and the Recharge Master Plan report all document the importance of a regional recycled water program to the Chino Basin and support the implementation plan presented in the 2000 UWMP.

In 2005, recycled water use totaled about 8,000 acre-feet (AF) of which 7,000 AF was used for outdoor irrigation and industrial processes and 1000 AF for groundwater recharge (during the summer of 2005 IEUA began expanding its recharge of recycled water under the Phase 1 permit with initial deliveries at Banana and Hickory recharge facilities). During the next few years recharge will increase rapidly. Therefore, the Recycled Water Plan presented in the 2000 UWMP is being implemented as described.